

THE GREAT BAY COAST WATCH

2001 ANNUAL REPORT

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**Sea Grant Extension
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of
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This report represents the combined efforts of many contributors. The following people, foundations, municipalities and agencies made the 2001 Great Bay Coast Watch sampling season possible:

Volunteers:

We particularly want to thank the more than 300 volunteers who have participated in the Great Bay Coast Watch community volunteer monitoring program during the past twelve years. Their dedication, time, effort, energy, and financial support have resulted in the most comprehensive long-term database of water quality data collected for the Great Bay system. The water quality information collected by the volunteers continues to be a key component of the local, regional, state, and federal natural resources decision-making process within the estuarine system. The high-quality database documenting Great Bay water quality is one result of the volunteers' continued long-term commitment to the health of this valuable ecosystem.

Agencies:

New Hampshire Coastal Program
New Hampshire Estuaries Project
New Hampshire Department of Environmental Services

Communities:

Shankhassick (Durham)

Foundations:

Davis Conservation Foundation
Greater Piscataqua Community Foundation

Municipalities:

Dover	New Castle
Durham	Newington
Eliot (ME)	
Exeter	Portsmouth
Greenland	Rye
Lee	South Berwick (ME)

University of New Hampshire:

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The Great Bay Coast Watch Mission Statement

The Great Bay Coast Watch is citizen volunteers working within the UNH Cooperative Extension/Sea Grant Program, protecting the long-term health and natural resources of New Hampshire's coastal waters and estuarine systems through monitoring and education projects.



Executive Summary

The Great Bay Coast Watch (GBCW) was founded in 1990 as part of the University of New Hampshire Cooperative Extension/NH Sea Grant outreach. The GBCW mission is to protect the long-term health of New Hampshire's coastal environment through volunteer monitoring and education programs. The purpose of this annual report is to describe and interpret water quality monitoring data collected from the Great Bay Estuarine system by volunteers. It is intended to benefit educators, researchers, resource managers, decision-makers, and interested citizens.

GBCW is New Hampshire's most wide-ranging program for direct citizen involvement in monitoring estuarine waters. The GBCW strives to involve citizens in conservation efforts aimed at the whole Great Bay estuarine system, as well as teach them to be conscious of how activities in their own backyards affect the Great Bay Estuary. GBCW includes adults from all occupations, as well as teachers and students from local schools.

Since 1990, GBCW has expanded water quality monitoring coverage from seven sites to twenty-one sites, plus added extra six sites for phytoplankton surveying. The database contains results from over 700 monitoring visits during the April to November monitoring season. At each visit, GBCW volunteers measure water temperature, pH, salinity, dissolved oxygen, transparency, depth, and fecal coliform bacteria. Samples are taken at high tide and low tide on the same day. All sampling activities are subject to rigorous quality control procedures.

Key indicators show good overall health of the Great Bay Estuarine System. The following values are composite of all averages and geometric means. Dissolved oxygen saturation was 86.6% (low tide), well above the state water quality standard of 75% saturation. Fecal coliform counts were 45 FC colonies per 100 ml (low tide), similar to the values collected in 2000 and above the state shellfish standard of 14 counts per 100 ml. The state does not collect samples at high tide, so we do not have a comparison for those values. Water clarity was good at 1.6 meters (5.2 feet) average visibility during high tide. Salinity was at an average of 16.3 ppt at low tide and 19.9 ppt at high tide. Water temperature averaged 16.2 °C at low tide and 17.1° C at high tide.

Both salinity and water temperature values were higher compared to those collected in 2000 due possibly to the severe drought in 2001. However, these key indicators vary with location and over time. Salinity increases in a drought since it is not mixing with as much fresh water as normal. Temperature increases because the water is shallower, and with increased contact with the air and light, it has an increased opportunity to warm. Site by site comparisons showed considerable variability in water quality measurements. Consistently low dissolved oxygen readings were observed at sites near the mouths of the Winnicut and the Lamprey Rivers as well as at South Mill Pond. Fecal coliform counts were of the highest at Exeter and Portsmouth (Bartlett Avenue) and varied considerably at Portsmouth's South Mill Pond. Seven sites were consistent with approved classification for shellfish harvesting with regard to geometric mean fecal coliform levels.

This season many notable events occurred. The National Marine Educators Association awarded GBCW Coordinator, Ann S. Reid the title "National Marine Educator of the Year." GBCW trained 25 new students from five area schools and twenty-five additional adult volunteers. During the 2001 season, volunteers provided over 2,500 hours of service, increasing the total for the entire program since 1990 to over 127,500 hours. GBCW received grants to issue brochures and expand its web site, gbcw@ceunh.unh.edu. The GBCW presented its *Ten-Year Report on the Volunteer Water Quality Monitoring of the Great Bay Estuarine System* at the kick-off meeting of the twelfth monitoring season.

GBCW continued its close association with activities related to its primary interest in water quality. We assisted Dr. Dave Burdick, Dr. Ray Grizzle, Dr. Larry Ward, and the Portsmouth Middle School 8th grade teachers and students in mussel reef planting at South Mill Pond. Volunteers took part in a number of potential pollution source identification and flow studies with the NHDES Shellfish program. The phytoplankton-monitoring program continued into its second full season. Trained volunteers collected information weekly on water quality and the phytoplankton present at six sampling sites and Star Island, Isles of Shoals. Continuing our relationship with the Isles of Shoals Steamship Line and the NH DES/Shellfish Program, volunteers maintained a Paralytic Shellfish Poisoning (PSP) sampling site at Star Island, transplanting mussels and retrieving them at a later date for toxin analysis in Concord. At the end of the 2001 sampling season, with financial support from the Greater Piscataqua Foundation, a report was created and published detailing the results of the first two years of sampling.

GBCW employs several quality assurance and quality control (QAQC) activities to detect inconsistencies in field measurements, and to ensure the quality of the monitors' measurements. This year, in all cases, volunteers were within the preset GBCW goal for precision and within the majority of our goals for accuracy as set by our U.S. Environmental Protection Agency (EPA)-approved QAQC plan. This indicates that the volunteers are measuring the water quality parameters with accuracy and precision, and that the data can be viewed with confidence. The issue of the accuracy and precision of the volunteers will continue to be addressed and tested by the GBCW QAQC sessions. Continued training and practice will bring these results in line with our QAQC plan.

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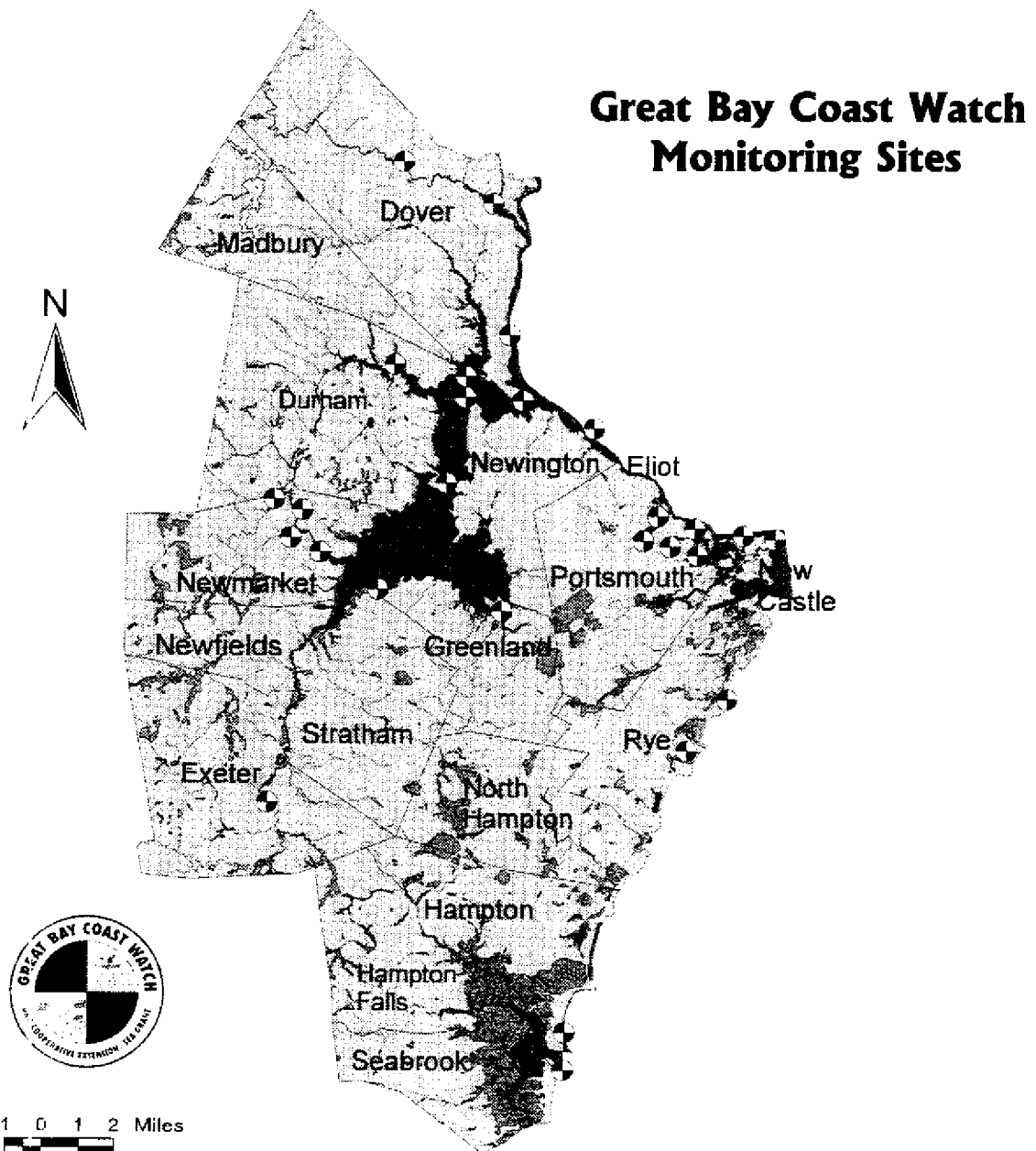
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A. The Great Bay Estuarine System and the Great Bay Coast Watch

The Great Bay Estuarine System and where it is located

The Great Bay Estuarine System is one of two major estuaries on the coast of New Hampshire. It is a complex embayment composed of the Piscataqua River, Little Bay, and Great Bay that drains a watershed of 930 square miles, one-third of which is found in the state of Maine. Five rivers - the Oyster, Bellamy, Lamprey, Squamscott, Winnicut flow into Great and Little Bay and two rivers the Salmon Falls and Cocheco flow into the Piscataqua River. The Piscataqua serves as part of the boundary between Maine and New Hampshire.



The Importance of Estuarine Ecosystems

The waters of the Great and Little Bays, and all the connected river areas are known as estuarine waters. An estuary is an area where freshwater mixes with sea water (Ketchum 1951). Most estuaries are tidal and contain many types of wetlands, including salt marshes, which until only recently were considered worthless parcels of land. They are now known to play an important role in filtering the waters of the estuary, serving as a nursery for saltwater fish, and harboring many organisms unique to this environment. Therefore, environmental degradation of this ecosystem would impair its valuable function and lead to lower water quality in the bays. Information garnered about estuarine water quality from both professional programs and volunteer programs like GBCW support efforts to preserve estuarine waters as well as wetland habitats -- a top priority of statewide conservation efforts.

Conservation efforts are hindered by the increase in the local human population and attendant development pressures. The table below gives the census figures for just the past 40 years and a ten-year projection for the future growth of the population in Great Bay communities. With marked increases in most town populations every decade for the past 40 years, there is no doubt that populations have increased and will continue to increase between 1990 and 2010. Residential development creates pressures that strain the ecosystem and lower its ability to rebound from the pollutants and habitat destruction caused by human activities.

POPULATION GROWTH IN GREAT BAY COMMUNITIES						
	United States Census					Projection
	1960	1970	1980	1990	2000	2010
Dover	19,131	20,850	22,377	25,042	26,884	29,205
Greenland	1,196	1,784	2,129	2,768	3,208	3,825
Madbury	556	704	987	1,404	1,509	1,733
Newfields	737	843	817	888	1,551	1,432
Newington	1,045	798	716	990	775	931
Newmarket	3,153	3,361	4,290	7,157	8,027	9,728
Stratham	1,033	1,512	2,507	4,955	6,355	7,898
Total	26,851	29,852	33,823	43,204	48,309	54,752

Source: 1960, 1970, 1980, 1990, 2000 U.S. Census; NH Office of State Planning (for 2010 projections using 1/99 report).

The water and sewage treatment facilities that serve the surrounding communities are also feeling an increase in the pressure from the many people who are building homes along the shorelines of rivers and bays. Reducing impacts from shoreland changes keeps water quality higher.

The chart below shows the treatment levels and amounts of wastewater being processed each day in the towns bordering the Great Bay Estuarine System. Since 1982, the total average daily flow of all the treatment facilities listed below has increased annually by 0.33 million gallons per day. Although many of the wastewater treatment facilities periodically upgrade their systems to accommodate increased development, the path of water flow to the Gulf of Maine is increasingly altered.

Community Served	Treatment Level	Ave. Daily Flow Basis* '96 Revised 2002	Receiving Water	Year Started
New Hampshire				
Dover	Secondary	2.2 million	Cocheco River	1955
Durham	Secondary	1.35 million	Oyster River	1965-1980
Exeter	Secondary	1.5 million	Squamscott River	1965
Newmarket	Secondary	0.85 million	Lamprey River	1971
Newington	Secondary	0.18 million	Piscataqua River	1980
Portsmouth (Pierce Is.)	Adv. primary	4.9 million	Portsmouth	1964
Pease AFB/Tradeport	Secondary	0.80 million	Piscataqua River	1953-1998
Rollinsford	Secondary	0.50 million	Salmon Falls	1967
Somersworth	Secondary	2.4 million	Salmon Falls	1967
Maine				
Berwick	Secondary	1.1 million	Salmon Falls	1975
South Berwick	Tertiary	0.35 million	Salmon Falls River	1965-1995

* in gallons per day

Total = 16.13 million

Only through improvements in water management, water quality assessments and conservation efforts on the part of everyone, will the estuary uphold that reputation. GBCW strives to involve citizens with conservation efforts aimed toward the whole Great Bay Estuarine System and the neighboring Hampton/Seabrook estuary. GBCW also requests that citizens be conscious of how activities in their own backyards affect these estuaries.

The Great Bay Coast Watch

Currently, the GBCW is New Hampshire's most wide-ranging program for direct citizen involvement in monitoring estuarine waters. The GBCW includes adults from all occupations, as well as students and teachers from local schools. GBCW was formed as Great Bay Watch in 1990 with funding from NOAA, in response to the Great Bay National Estuarine Research Reserve Management Plan, which listed the formation of a citizen estuarine monitoring program as one of its objectives. The Great Bay Coast Watch has been a part of the educational efforts of Cooperative Extension/NH Sea Grant Programs of the University of New Hampshire for the past twelve years. In 1999, to more accurately reflect a growing involvement of our volunteers in coastal shoreline surveys and phytoplankton monitoring projects, "Coast" was added to the name. The number of volunteer monitors has tripled since 1990, and the GBCW now samples more than twice as many sites as when it began. In 2001, we have continued our dedication to monitoring projects on the seacoast through another season of phytoplankton monitoring and participation in rainfall characterization studies in Great Bay and the Bellamy River.

The mission of the GBCW is, citizen volunteers working within the UNH Cooperative Extension/Sea Grant Program, protecting the long term health and natural resources of New Hampshire's coastal waters and estuarine systems through monitoring and education projects.

The GBCW has three specific goals:

1. To monitor the chemical, physical, and biological systems of New Hampshire coastal waters and the Great Bay Estuarine System.
2. To educate residents of New Hampshire's coastal and estuarine communities about the ecological status and protection of these seacoast systems.
3. To develop a management structure that engages volunteers in all aspects of the GBCW and continuously improves the quality of the monitoring and education projects.

The GBCW is managed by a coordinator and an extension specialist from UNH Cooperative Extension/Sea Grant. Currently, the GBCW has more than 100 adult members. More than 200 adults have been members of the GBCW over the past twelve years, with 17 enrolled in the program since its beginning. Involvement of area schools has grown from one school in 1990, to eight by 2001. (Portsmouth Middle School and Little Harbor School had been assigned a sampling kit and sampled regularly during the 1999, 2000 and 2001 seasons.) During the past twelve years, the monitors have driven thousands of miles and have given 127,500 volunteer hours to the program.

Agencies and Organizations Enriched by Great Bay Coast Watch Data

- The NH Department of Environmental Services (NHDES) includes GBCW data in the New Hampshire 305 (B) Water Quality Report to Congress. The NHDES has also benefited from the volunteers' assistance through the year.
- For the seventh consecutive year, Secchi disk depth data have been used by researchers at Kent State University to add to their extensive Secchi Dip-In database.
- Volunteers assisted the NHDES Shellfish Program in gathering information for rainfall studies.
- The NHDES Shellfish Program has used our fecal coliform data as preliminary indicators of sewer problems in Portsmouth.
- The New Hampshire Audubon Society and New Hampshire Fish and Game have used site observation data.
- UNH's Jackson Estuarine Laboratory uses fecal coliform data for preliminary indicators of potential hotspots.
- Volunteers collected fecal samples for a study on microbial source tracking being done by Natalie Landry of the NHDES and Dr. Steve Jones at UNH Jackson Estuarine Laboratory.
- Ten years of sampling data was analyzed and published as the *Ten Year Report on the Volunteer Water Quality Monitoring of the Great Bay Estuarine System*. This report will continue to be used for numerous presentations of the volunteer programs within UNH's Cooperative Extension.
- Volunteers assisted the NHDES Shellfish Program in sampling and transport of blue mussel samples from the Isles of Shoals in the Gulf of Maine to better understand the potential for Paralytic Shellfish Poisoning (PSP).
- Volunteers collected additional data on horseshoe crabs as part of an assessment for New Hampshire Fish and Game.
- The New Hampshire Department of Health and Human Services used data collected during shoreline surveys in Hampton Harbor to aid in the decision to open the Middle Ground clam-flats to recreational harvesting for the first time in ten years.
- Data collected during habitat studies and potential Pollution Source Identification Studies (PPSID) in Great Bay and the Bellamy River assisted the NHDES and Health and Human Services with the required triennial review of shellfish-growing areas.

- Data gathered from the Atlantic Coast was used for the shoreline survey in opening the area for shellfish harvesting.
- The GBCW trained the volunteers of the Advocates of North Mill Pond in Portsmouth in methods for sampling, and their results influenced the NHDES to focus on sampling in this area.
- Volunteer teams completed analysis of GBCW data for presentation to Conservation Commissions to educate local decision-makers about water quality issues in the Great Bay Watershed in the towns of Dover, Eliot, Exeter, Kittery, Greenland, Lee, New Castle, and Newmarket.
- Ryan Davis, now working for the Alliance for the Chesapeake Bay and former UNH doctoral student, used the Secchi depth data for his work with the Alliance for the Chesapeake Bay and eelgrass studies.

Why Monitoring is Important

Monitoring programs have been implemented in order to follow trends in the health of the Great Bay Estuarine System. In this case, monitoring also engages the volunteers in water quality issues. They can see that a number of water quality issues have been improved since the start of the program. If water quality problems occur in the future, these volunteers will feel like a part of the solution. Therefore, monitoring is important for the community in this important estuary. With the information provided by volunteers, problems can be detected and solved before they become critical. This information can then be used to implement precautionary measures to protect the resource.

Monitoring usually consists of repetitive measurements or observations of a system recorded over a period of time. Past scientific studies have shown that long-term monitoring can be very important in acquiring an ecological blueprint of a system because:

- Complex ecological systems require long-term observation and study for understanding.
- A sequence of only 2 to 3 years of data can be very misleading about the direction of trends in environmental quality;
- Environments have a “memory” or response time that varies greatly. It takes perhaps a decade for lakes and a century for soil to detect change.

It is for these reasons that the GBCW program is especially important. With the database of information collected by volunteers over the past twelve years, a much more accurate picture of the environmental state of the Great Bay Estuarine System is available to communities

B. Participants and Supporters

The Volunteers and Monitors of the Great Bay Coast Watch

In 2001, the GBCW consisted of more than 100 active volunteers from 20 communities around the Great Bay Estuarine System. The volunteers include retired adults, teachers and high school students, home-schooled families, and a variety of working professionals. A number of the GBCW members are UNH Marine Docents, volunteers who have a five month educational training program about the marine environment. During April through November, volunteers sample once a month at 21 different sites. Each site team is composed of two to four members. The GBCW uses a volunteer team approach to perform and complete Quality Assurance/Quality Control (QAQC) checks, water sample processing for fecal coliform, shoreline surveys, and habitat studies. An additional 40 people provide support for the GBCW in many ways, ranging from the use of docks, to office help, technical advice and financial contributions. Additionally, about 28 volunteers participate in the phytoplankton monitoring program, sampling weekly at six sites on the seacoast from March to October (see Phytoplankton Monitoring section)

Participating Schools

Eleven area schools were actively involved with GBCW during the 2001 sampling season. The Oyster River High School in Durham has a program coordinated by Laura Parsons. Students helped sample at site 1 on the Oyster River. In Eliot, Maine, Marshwood High School's program coordinated by Joyce Tugel and Jeff Gardner helped to sample at site 15, Patten Yacht Yard. Linda Scherf coordinated St. Mary Academy's seventh and eighth graders in Dover and they sampled at site 17 on the Dover footbridge. St. Thomas Aquinas High School students, coordinated by Dr. William McGrew, sampled at site 10 on the Piscataqua River in Dover. The New Franklin School in Portsmouth sampled at site 19, overseen by Ann Smith. Site 20 was sampled by eighth graders at Portsmouth Middle School and was coordinated by Ruth Larkin and Ken Hawkins. The students and faculty at Little Harbor School in Portsmouth sampled site 22, which is lead, by teacher Trish Lee.

Home schooled families are also involved with the program. This year the Blake family sampled at site 2 at the Jackson Estuarine Lab (JEL) and were integral members of the team processing samples for fecal coliform bacteria. The Wensman family sampled sites 6 at Fox Point and were filmed for a spot on NHPTV's ZOOM into Action. They also assisted with processing samples for possible fecal coliform bacteria.

Active Monitors in Each Town

Dover

- Site 9 Fran Chickering, Nate Hazen, Nell Neal, Peg Richardson, Lydia and David Scott
Site 10 Laura Adams, Muffie Hendricks, William Kram, Dr. Bill McGrew and Larry Pilla
Site 17 Laura, Linda, and Paula Scherf, St. Mary Academy students, and Barbara Trow

Durham

- Site 1 Laura Parsons, Jennifer Wainright and ORHS students
Site 2 Christine, Elise and Malorie Blake and Donna Desautels-Pease
Site 7 Jennifer Lee, Cecil Charles Maxfield, and Robert Rowe

Eliot, Me

- Site 15 Jeff Gardner, Barbara Reid, Joyce Tugel, and Marshwood High School students

Exeter

- Site 16 Nathan Hazen, Ibbey Lourie, Nancy Alcock, John Scott and Victor Tyne

Greenland

- Site 4 Peggy Mullin, Liz Sizemore, and Patty Warren
Site 5 Barbara Baird, Don Chamberland, and Susan McCarthy

New Castle

- Site 11 Alix DuSoulier, Ted and Ben Jankowski, and Cecil Charles Maxfield
NHCP sampler at the Coastal Marine Lab - Joanne McLaughlin

Newington

- Site 6 Nancy Cauvet, Barbara Hill and Michele, Sam and Sophie Wensman

Newmarket

- Site 3 Don Bassett, Valerie England, Angela Hiley, and Sarah Rieley
Site 12 David Bryant, Larry Fahey, Debra Glidden, Diane Lundell, and Patti Sewall
Site 13 Patti Sewall and Marilyn Young
Site 14 Linda Albright, Audrey Fortin, Owen Pope, Russell Pope, and the students of
Newmarket High School

Portsmouth

- Site 18 Ellen Douglas, Judy Miller, and Wes Tator
Site 19 Mary Loughlin, New Franklin School students, Ann Smith
Site 20 Ken Hawkins, Ruth Larkin, Sally Martin, Kathy Pearce, and the students at Portsmouth Middle School
Site 21 Clif Horrigan, Deborah Kendall, and Diana McNabb
Site 22 Brenda Brewster, Robin Burdick, Trish Lee and students at Little Harbor School.

Alternate Samplers

Bob and Alice Briggs, Donna Desautels-Pease Candace Dolan, Jennifer Fox, Jim Horrigan, Jack and Jane Jette, Sylvia Jones, Judy and Alex Kontor, Bill Pagum, and Carl Paulsen



Sample Transport

Clif Horrigan , Bill Wetzel, Bill Detman, Wally Fries, Steve Cooper

Data Management

Karen Diamond, Candace Dolan, Bill Pagum, Kevin Ronkko

University of New Hampshire Interns

Ben Curran – Natural Resources, 2001

Kevin Ronkko – College of Life Long Learning

Sean Maxwell – Natural Resources (Summer Intern)

2001 Technical Advisory Committee

The Technical Advisory Committee oversees the functioning of GBCW and provides technical support.

Bill Arcieri is a water resources specialist who runs Great Bay Environmental Consulting in Newmarket. He has 14 years of professional experience in evaluating water quality impacts related to nonpoint pollution sources and land-use development activities.

Dr. Dave Burdick is a Research Associate Professor for Natural Resources at the University of New Hampshire. He works out of the Jackson Estuarine Laboratory at Adam's Point, specializing in wetlands, salt marshes and eelgrass meadows.

Dr. Steve Jones, is a Research Associate Professor, Jackson Estuarine Laboratory, University of New Hampshire, and a bacteriologist in the Department of Natural Resources at UNH. He conducts research on the processes affecting nutrient and microbial nonpoint source pollution in coastal areas; shellfish sanitation and processing; ecology of indigenous estuarine bacterial pathogens; bioremediation of toxic compounds, and microbiology of cultured finfish larvae. He is also project manager for the Gulfwatch Monitoring Program throughout the Gulf of Maine.

Ray Konisky is a graduate student at the University of New Hampshire. His research interests include coastal and estuarine ecology, and software simulation modeling of coastal ecosystems. He co-authored the ten-year report *Great Bay Coast Watch 1990-1999*.

Natalie Landry is Coastal Watershed Coordinator for NHDES. Her main focus is habitat and water quality restoration in the Seacoast. She is also involved in pollution source investigations and environmental monitoring.

Joanne McLaughlin is the coordinator of the Coastal Nonpoint Pollution Control Program for the NH Coastal Program in the Office of State Planning.

Bill Pagum serves as the GBCW data coordinator and co-authored the ten-year report, *Great Bay Coast Watch 1990-1999*. He has been previously employed in the petrochemical and nuclear propulsion fields, and has a degree in chemical engineering from Cornell University.

Jeff Schloss is Coordinator of the NH Lakes Lay Monitoring Program at Cooperative Extension, University of New Hampshire. A Research Scientist with UNH Freshwater Biology Group, he manages a volunteer monitoring program and supports monitoring programs throughout the region. He also works with watershed water-quality monitoring and modeling, applied limnology, GIS applications for water resources/protection.

Brian Smith is the Research Coordinator for the Great Bay National Estuarine Research Reserve (GBNERR) and works as a marine fisheries specialist for the New Hampshire Department of Fish and Game (Region 3) on monitoring programs for lobsters, oysters and finfish. He also has a background in freshwater fisheries ecology.

Joyce Tugel is a Science / Professional Development Specialist for the Northeast Eisenhower Consortium at the TERC in Cambridge, Massachusetts. Prior experience includes ten years of teaching chemistry at Marshwood High School in South Berwick Maine, where she incorporated the GBCW program into her curriculum. Before becoming a teacher, she was a research scientist in environmental biogeochemistry.

Working with a newly revised strategic plan, the following committees were developed and expanded in 2001:

Advisory Committee

The Advisory Committee provides resources for growth, direction, and sustainability.

Ann Reid is the Great Bay Coast Watch Coordinator.

Naida Keen is a member of the New Hampshire General Court (House of Representatives). Appointed to Science, Technology, and Energy Committee. She lives in Lee and is a realtor in the seacoast area. She has been an active supporter of the Lamprey River Watershed Association.

Sharon Meeker, Marine Education Specialist, supervises the GBCW program staff and administers the UNH/ Sea Grant Marine Docent Program.

Chris Nash, Director of the NHDES Shellfish Program, is a University of New Hampshire graduate with an MS in hydrology.

Joe Payne, Casco Bay Baykeeper directs Friends of Casco Bay, formerly worked for Normandeau Associates in the Hampton/Seabrook area.

Bill Penhale, UNH Docent and long-time Watcher, is a retired physician.

Marjorie Smith has represented Durham since 1997 in the New Hampshire General Court (House of Representatives). She and her husband Peter live on Oyster River and their dock is one of the original docks used as a sampling site.

Judith Spang is a member of the New Hampshire General Court (House of Representatives) and a member of the Lamprey River Advisory Commission.

Wes Tator is a Watcher, lives in Dover, works with Dover Main Street Program, and is a commercial realtor with Coldstream Realty.

Development Committee

The GBCW formed a development committee last season to be responsible for development of funding sources and raise awareness of the GBCW mission and its activities. This committee makes decisions concerning the events and projects the program will consider, as well as serving as an advisor to the coordinator. The main fundraising effort this season was an Annual Award Dinner that was held at the Atlantic Academy Culinary School at McIntosh College, Dover, N.H.

Wes Tator, Chairman

Candace Dolan

Sue Foote

Angela Hiley

Muffie Hendricks

Wally Fries

Bill Pagum

Rosemary Tator

Jennifer Fox



Area Leaders

A new addition to the leadership of the GBCW, the Area Leaders serve as liaisons between the volunteers and the coordinator and staff. Area leaders are a crucial part of ensuring an efficient means of communication. There are six areas within the program, geographically sorting the following sites:

Area	Sites	Leaders
Exeter/Stratham	4, 5, 16	Nate Hazen
Newmarket	3, 12, 13, 14	Michele Wensman
Durham/Eliot, ME	1, 2, 6, 7, 15	Laura Parsons
Dover	9, 10, 17	Nell Neal
Portsmouth/New Castle	11, 18, 19, 20, 21, 22	Clif Horrigan
Phytoplankton	All Phytoplankton Sites	Steve Cooper

Quality Assurance and Quality Control (QAQC) Team

The QAQC team was formed to assure quality in methods and data collection for the GBCW. The team was responsible for assisting with the set-up, running and reporting of the QAQC lab sessions, and the split sampling in the field.

Barbara Baird	Karen Diamond	Sue McCarthy
Elise Blake	Candace Dolan	Peggy Mullin
Malorie Blake	Jennifer Fox	Liz Sizemore
Donna Desautels-Pease	Clif Horrigan	Barbara Trow

Water-Sample Processing Team for Fecal Coliform

The Processing Team works in the Fecal Coliform Laboratory. at Kingman Farm, processing samples from each of the sample sites for each tide. Many of the volunteers on the team come from laboratory science backgrounds, lending their skills and knowledge where the GBCW needs them most.

Elise Blake	Karen Diamond	Jennifer Fox
Malorie Blake	Candace Dolan	Kerri Hartman
Donna Desautels-Pease	Barbara Elkerton	Sam Wensman
		Michelle Wensman

Rainfall Characterization Team (Known as the Rainfall Runoff Runners)

The GBCW received a grant from the New Hampshire Estuaries Project (NHEP) for their participation in a rainfall characterization study with the NHDES Shellfish Program. This study entailed numerous field hours over a short amount of time. This team of on call volunteers took water samples from designated culverts, drainpipes, and other sites around the Hampton/Seabrook Harbor. Additional sampling days took place at sites around Little Harbor, Bellamy River and Great Bay.

Barbara Baird	Wally Fries	
Elise Blake	Nate Hazen	Bill Pagum
Malorie Blake	Judy Kontor	Donna Desautels Pease
Don Chamberland	Alex Kontor	Bob Rowe
Candace Dolan	Sean Maxwell	Bill Wetzel
Steve Cooper	Diane Monroe	
Susan Foote		

B. Accomplishments, Awards and Positive Impacts

Major accomplishments of the Great Bay Coast Watch in the past 12 years:

- In 2001, the GBCW published the *Ten Year Report on the Volunteer Water Quality Monitoring of the Great Bay Estuarine System*, an extensive report analyzing the ten years of data collected by the GBCW.
- National Marine Educator of the year from the National Marine Educator's Association went to Ann S. Reid.
- The New Hampshire Coastal Program awarded GBCW a grant to pursue shoreline survey work and potential pollution identification in the towns of Newmarket and Dover. A team of volunteers presented results along with GBCW long-term monitoring data to the conservation commissions in each town.
- GBCW was successful in obtaining funding from the New Hampshire Coastal Program and New England Grassroots Environmental Fund to launch a volunteer phytoplankton monitoring program. NHCP continued to fund the phytoplankton program for its second season.
- A core of volunteers has been educated about the importance of conserving the estuary and its resources, and the Watch has provided a direct avenue for their active participation in the process. Volunteers learned a variety of estuarine sampling techniques including shoreline survey methods and potential pollution source identification (PPSID). Several GBCW members have become active participants on NHEP committees, and local conservation commissions.
- With the guidance of the Development Committee, a fundraising award dinner in the fall of 2001 raised an additional \$2,000.
- GBCW completed a contract with the NH Estuaries Project to recruit and train volunteers to assist in the shoreline survey of the Atlantic Coast. Results of this project will be used by the Department of Environmental Services to classify shellfish-growing waters along the coast.
- GBCW received two grants from the New Hampshire Estuaries Project to train volunteers and coordinate shoreline surveys, including habitat structure and quality, organism distribution, and potential pollution source identification. This assisted in the reopening of clam-flats in the Hampton/Seabrook Estuary.
- Governor Jeanne Shaheen's Council on Volunteerism recognized GBCW as the 1998 Outstanding Adult Volunteer Group in Strafford County.
- GBCW has produced data results comparable to those collected by scientists from UNH's Jackson Estuarine Laboratory, the New Hampshire Office of State Planning, New Hampshire Department of Health and Human Services and NHDES.

- The Watch provides a model for other sampling groups and has many requests for its sampling manual and the EPA-approved, Quality Assurance Quality Control Plan.
- GBCW expanded data management capabilities with an ACCESS database and worked with the Cooperative Institute for Coastal and Estuarine Environmental Technology (CICEET) to have annual reports and GBCW data available on their website.
- GBCW worked with nine schools giving students a more direct link to their communities. The New Franklin, Little Harbor and Middle schools in Portsmouth are working with GBCW as part of a service learning grant. GBCW assisted the Epping Junior/Senior High school with launching a river-monitoring program.
- Linda Scherf, a teacher at St. Mary's Academy, monitors with the 7th and 8th grades in down town Dover. Linda recently received the Gulf of Maine Visionary Award from the Gulf of Maine Council on the Environment.
- Participation in local, state, regional, and national events including conferences, workshops, and committees helped to focus public attention and interest on the vital roles of estuaries.
- Participation in the GBCW has provided science career-related information and experience for students and has been a direct influence on the choice of careers for several GBCW student interns and student volunteers.
- Made possible by a grant from the Greater Piscataqua Community Foundation, a new full color brochure was produced in 2000.
- An additional site was added to the NHDES PSP monitoring and the Phytoplankton Monitoring Program at the Isles of Shoals in the Gulf of Maine. Partnership with the M/V Thomas Loughton of the Isles of Shoals Steamship Company made the transportation of mussels and monitors to and from the Isles of Shoals regular and efficient.

Tidal and Sampling Schedule for 2001 Season

GBCW conducts baseline water quality monitoring one day per month scheduled on the weekday closest to the full moon. (From 1990 to 1997, GBCW sampled two days per month.) Samples are collected at both the low and high tide of each sampling day. GBCW sampling is scheduled at low tide in the morning and thus reflects the worst-case scenario dissolved oxygen readings. Each site has a specific time when GBCW volunteers sample, reflecting the lowest possible tide and the highest possible tide of for each site. Each year's schedule is unique. The sampling schedule that the GBCW used was adapted using the Maine Geographic Calendar and Almanac, by DeLorme Maps of Freeport, Maine. (See the following pages.)



Tidal and Sampling Times for 2001 Season

Date	24-Apr	23-May	21-Jun	23-Jul	20-Aug	18-Sep	17-Oct	1-Nov	
LOW	6:18	5:52	5:27	7:41	6:20	6:06	5:43	4:...	
HIGH	12:02	12:05	11:40	12:57	12:43	12:20	11:57	10:4	
Adjustment									
Site 1 - Peninsula - Oyster River	LOW 1:50	8:08	7:42	7:17	9:31	8:10	7:56	7:33	6:26
	HIGH 1:45	13:47	13:50	13:25	15:42	14:28	14:05	13:42	12:32
Site 2 - Jackson Laboratory	LOW 2:00	8:18	7:52	7:27	9:41	8:20	8:06	7:43	6:36
	HIGH 2:00	14:02	14:05	13:40	15:57	14:43	14:20	13:57	12:47
Site 3 - Lamprey River	LOW 3:00	9:18	8:52	8:27	10:41	9:20	9:06	8:43	7:36
	HIGH 2:40	14:42	14:45	14:20	16:37	15:23	15:00	14:37	13:27
Site 4 - Depot Road (Sandy Pt)	LOW 2:45	9:03	8:37	8:12	10:26	9:05	8:51	8:28	7:21
* High Tide Only	HIGH 2:45	14:47	14:50	14:25	16:42	15:28	15:05	14:42	13:32
Site 5 - Portsmouth Country Club	LOW 2:40	8:58	8:32	8:07	10:21	9:00	8:46	8:23	7:...
	HIGH 2:20	14:22	14:25	14:00	16:17	15:03	14:40	14:17	13:07
Site 6 - Fox Point	LOW 2:00	8:18	7:52	7:27	9:41	8:20	8:06	7:43	6:36
	HIGH 2:00	14:02	14:05	13:40	15:57	14:43	14:20	13:57	12:47
Site 7 - Cedar Point	LOW 1:50	8:08	7:42	7:17	9:31	8:10	7:56	7:33	6:26
	HIGH 1:55	13:57	14:00	13:35	15:52	14:38	14:15	13:52	12:42
Site 9 - Cocheco River	LOW 1:20	7:38	7:12	6:47	9:01	7:40	7:26	7:03	5:56
	HIGH 1:20	13:22	13:25	13:00	15:17	14:03	13:40	13:17	12:07
Site 10 - Piscataqua River	LOW 1:20	7:38	7:12	6:47	9:01	7:40	7:26	7:03	5:56
	HIGH 1:20	13:22	13:25	13:00	15:17	14:03	13:40	13:17	12:07
Site 11 - Coastal Marine Lab	LOW 0:16	6:34	6:08	5:43	7:57	6:36	6:22	5:59	4:52
	HIGH 0:16	12:18	12:21	11:56	14:13	12:59	12:36	12:13	11:05

Tidal and Sampling Times for 2001 Season

Date		24-Apr	23-May	21-Jun	23-Jul	20-Aug	18-Sep	17-Oct	1-Nov	
LOW		6:18	5:52	5:27	7:41	6:20	6:06	5:43	4:36	
HIGH		12:02	12:05	11:40	13:57	12:43	12:20	11:57	10:47	
Adjustment										
Site 12 - Newmarket STP	LOW	3:00	9:18	8:52	8:27	10:41	9:20	9:06	8:43	7:36
	HIGH	3:00	15:02	15:05	14:40	16:57	15:43	15:20	14:57	13:47
Site 13 - Marina Falls Landing	LOW	3:00	9:18	8:52	8:27	10:41	9:20	9:06	8:43	7:36
	HIGH	3:00	15:02	15:05	14:40	16:57	15:43	15:20	14:57	13:47
Site 14 - Fowler's Dock	LOW	3:00	9:18	8:52	8:27	10:41	9:20	9:06	8:43	7:36
	HIGH	3:00	15:02	15:05	14:40	16:57	15:43	15:20	14:57	13:47
Site 15 - Patten Yacht Yard	LOW	1:00	7:18	6:52	6:27	8:41	7:20	7:06	6:43	5:36
	HIGH	1:00	13:02	13:05	12:40	14:57	13:43	13:20	12:57	11:47
Site 16 - Exeter Docks	LOW	2:50	9:08	8:42	8:17	10:31	9:10	8:56	8:33	7:26
	HIGH	3:10	15:12	15:15	14:50	17:07	15:53	15:30	15:07	13:57
Site 17 - Dover Foot Bridge	LOW	2:50	9:08	8:42	8:17	10:31	9:10	8:56	8:33	7:26
	HIGH	3:10	15:12	15:15	14:50	17:07	15:53	15:30	15:07	13:57
Site 18 - Maplewood Ave	LOW	1:16	7:34	7:08	6:43	8:57	7:36	7:22	6:59	5:52
	HIGH	1:16	13:18	13:21	12:56	15:13	13:59	13:36	13:13	12:03
Site 19 - Bartlett St	LOW	1:16	7:34	7:08	6:43	8:57	7:36	7:22	6:59	5:52
	HIGH	1:16	13:18	13:21	12:56	15:13	13:59	13:36	13:13	12:03
Site 20 - Junkins Ave	LOW	1:16	7:34	7:08	6:43	8:57	7:36	7:22	6:59	5:52
	HIGH	1:16	13:18	13:21	12:56	15:13	13:59	13:36	13:13	12:03
Site 21 - Pleasant St	LOW	1:16	7:34	7:08	6:43	8:57	7:36	7:22	6:59	5:52
	HIGH	1:16	13:18	13:21	12:56	15:13	13:59	13:36	13:13	12:03
Site 22 - Little Harbor	HIGH	1:16	13:18	13:21	12:56	15:13	13:59	13:36	13:13	12:03

Presentations, Exhibits and Displays in 2001:

The GBCW staff and volunteers presented and participated in:

- 14th Annual Coastal Clean-up
- 7th Annual National Secchi Dip-In
- Strategic planning
- 3rd Annual BBQ and Joint Meeting for sustainability of the GBCW, Great Bay Stewards and Friends of the Great Bay National Wildlife Refuge
- Board of Directors for the Great Bay Stewards (Education Committee Chair)
- Cochecho River Watershed Coalition Advisory Committee
- Duckers' Day 2001
- Dover's Apple Harvest Festival
- CREES Water Quality Monitoring National Meeting in Narragansett, RI
- Coastal Network for the Gulf of Maine (CNET)
- Gulf of Maine Marine Education Association Conference (GOMMEA)
- NH Estuaries Project (NHEP) Watershed Forums
- South Mill Pond Restoration Project with Portsmouth Middle School included mussel reef planting, fish measuring and counting.
- Conservation Commissions in Exeter, Lee, Greenland, New Castle, and Rye, as well as Eliot and Kittery, Maine
- Advisory Committee to the Advocates of the North Mill Pond
- Storm Drain Stenciling and Watershed Education project for CICEET
- Teacher workshop for Quincy, MA teachers at UMASS Boston for water quality monitoring techniques and equipment.
- Exeter River Alewives Festival
- York River Festival
- GBCW Display at Rivers Camera Shop, Dover NH, for two months.

Education and Training

- Four University of New Hampshire students were part-time interns at the GBCW this year. Students were involved in a number of different tasks including lab testing, QAQC, field sampling, fecal coliform lab procedures, data input, budget and bookkeeping, split sampling, statistical analysis, office support, publications, presentations, and a multitude of other tasks during meetings.
- Home-schooled families have become a consistent part of GBCW. Two families participated in training and the season as regular GBCW volunteers
- Approximately 25 new monitoring volunteers as well as 25 or more high school students were trained and worked as GBCW volunteers.
- Nearly twenty volunteers were trained in sampling techniques and potential pollution source identification and formed the team to work on granted projects with the NHDES Shellfish Program for NHEP.
- During monthly meetings for the GBCW several speakers enthusiastically informed members about the following topics:
 - Ray Konisky, Ann Reid, and Candace Dolan – GBCWers – Presented the GBCW Ten Year Report and discussed pre-season plans for Water Quality and Phytoplankton Monitoring.
 - Dave Hartman – Director of NHEP – Moderated a panel discussion on dredging involving the following participants: Eric Hutchins (US Fish & Game), Cynthia Lay (NHEP), Duban Montoya (EPA), Dean Peschel (Dover Environmental Project), Frank Richardson (NHDES Wetlands), Judith Spang (LRAC), Craig Wheeler (Director NH Ports & Harbors).
 - Ray Grizzle - Director of UNH Jackson Estuarine Laboratory (JEL) – Overview of JEL research as well as Linda Scherf's students presenting projects from St. Mary's Academy and Ruth Larkin's students explaining the mussel restoration project at Portsmouth's South Mill Pond.
 - Andy Chapman – NHDES – Reported on the Rainfall Runoff Program. Mary Power presented the findings of the 14th Annual Coastal Clean-Up.
 - Pat Van Wagoner – NH Public TV – Explained the role of “ZOOM Into Action” TV shows on New Hampshire's families and teachers. Peter Flynn and his wife presented a historical slide show on the origins of Great Bay.

Additional Projects

Phytoplankton Program Report

A sincere thank you to the hard working dependable GBCW Volunteer Marine Phytoplankton monitoring teams. Over the 2001 sampling season, they traveled over 3666 miles and contributed 560 hours in weekly sampling efforts. During the season, five new samplers who completed water quality training and practiced species identification while sampling with more experienced team members joined our returning volunteers.

Since June of 1999, with financial support from the New Hampshire Coastal Program, GBCW volunteers have been monitoring New Hampshire coastal waters for the presence of potentially harmful algae blooms (HAB's). Most species of algae or phytoplankton are not harmful and in fact are an important energy source at the base of the food chain. However, a small number of species can produce toxins, and when present in large numbers may concentrate in shellfish. When harvested and consumed by humans, these now toxic shellfish can cause sickness and even death. For example, *Alexandrium spp.* produces a toxin that can cause paralytic shellfish poisoning (PSP) in humans by concentrating in shellfish. New Hampshire is one of five coastal states including California and Maine who support the collection of volunteer data on the presence of these phytoplankton. Volunteers are trained to collect samples using a fine mesh net and then, using field microscopes, identify four target species that are known or suspected to be toxic. They include *Alexandrium spp.*, *Dinophysis spp.*, *Prorocentrum lima*, and *Pseudonitzschia spp.*

During the winter months, short days and cold temperatures limit phytoplankton productivity. Winter storms mix the water column distributing nutrients. As spring approaches, lengthening daylight hours and available nutrients trigger explosive blooms of phytoplankton. As the population consumes much of the available inorganic nitrogen, phosphorus and silica, a somewhat predictable ebb and flow of different species is evidenced through the sampling season.

Monitoring for the 2001 season began during the last week in March. Water temperature at that time was as low as 5.5 °C and, like the spring of 2000 the net tows showed a large number of the diatom *Phaeocystis pouchetii*, a small cell which attaches to form long colonies within a gelatinous mass.

Cells of the target species *Alexandrium spp.* were found in very low numbers during the late spring of 2001. Although a moderate bloom was reported along the Maine coast, increased numbers were not observed at the GBCW sampling sites. Only random cells delivered by the coastal currents were found at both Hampton and Seabrook sampling sites. *Alexandrium spp.* were virtually unknown in New Hampshire coastal waters until the fall of 1972 when hurricane Carrie passed through the Gulf of Maine during a massive toxic "red tide" bloom in the Bay of Fundy. The hurricane's counter clockwise winds intensified the traditional water current patterns and deposited cysts of the red tide *Alexandrium spp.* dinoflagellate along the Maine, New

Hampshire and Massachusetts coasts. The resultant establishment of populations along areas of the Maine coast and the Orleans section of Cape Cod continue to support sporadic seasonal blooms of this toxic cell which causes Paralytic Shellfish Poisoning (PSP).

Summer samples gave us lots of our easily identifiable favorites, the bold, flashy, and colorful non-toxic dinoflagellate *Ceratium spp.* and the Grecian urn-shaped *Dinophysis spp.* During the summer, volunteers continued to use our field microscopes for public outreach. Continuing our associations with the NHDES Shellfish Program and the Isles of Shoals Steamship Company, volunteers traveled to Star Island weekly to collect mussels for PSP analysis at the state lab in Concord. Phytoplankton and water samples were also collected and information was shared with interested onlookers. We also had contact during the season with whale watch customers, summer camp students at the Seacoast Science Center, and summer school students in North Hampton. Our microscopes continue to be a valuable bridge between tourists, local residents, and our GBCW program mission of education and research.

During the fall we found increased numbers of the cell *Pseudonitzschia spp.* reported at the Parsons Creek site in Rye, and also in the Hampton and Seabrook areas. Finding the cell in samples does not necessarily mean that shellfish are in danger of becoming toxic. There are many species of *Pseudonitzschia* but only a very few produce toxins, and only then under rare nutrient conditions. So far, samples sent for analysis to the USFDA Sea Food Laboratory in Washington D.C. have contained species not known to be capable of producing toxins.

Volunteer training opportunities this season included a trip to Bigelow Laboratory for Ocean Sciences, Boothbay Harbor Maine to join members of the Maine Cooperative Extension's Volunteer Phytoplankton Monitoring Program for a spring training session. Live phytoplankton samples for identification practice were supplied by the Guillian-Pravolli Culture Center at Bigelow.

Funded by a grant from the Greater Piscataqua Community Foundation, a report on the 2000-2001 phytoplankton monitoring data has been compiled and published. This report is now available for distribution and will be used to educate the public about the importance of phytoplankton and the issue of toxic blooms and will also be used as a GBCW recruitment tool.

Phytoplankton Monitors

Coordinator: Candace J. Dolan

Coastal Marine Lab / Coast Guard

New Castle Station: Tony Bower, Jim Bowman, Don Chamberland, Steve Cooper, Jim & Cliff Horrigan, Cindy Wolf, Barbara Zulkiewicz

Hilton Park:

Barbara Baird , Kari Hartman, Michelle Wensman, Sophie Wensman, Sam Wensman

Rye / Parsons Creek: Lyn Beattie, Jack Chambers, Andrew Stewart

Seabrook: Roy & Marie Jones

Hampton: Jack & Barbara Balaguer, Linda Coe

Star Island: Wally Fries, Brian "Jumbo" Jervis

Rainfall Runoff Runners (RRR's) Project Summary

This season the GBCW received financial support from the New Hampshire Estuaries Project to again assist the NHDES Shellfish Program in collection of water samples for potential pollution source evaluation and flow studies. Since sampling was for both wet and dry conditions at pipes, seeps, streams, or rivers, we dubbed the volunteers "Rainfall Runoff Runners." After completing the 130 pipe study in the spring/summer, GBCW RRR's moved on to about 165 locations in Great Bay, Little Bay, and the Bellamy River for the fall.

Chris Nash, NHDES Shellfish Program Manager, said the collaboration and performance of the staff and volunteers was excellent. Andy Chapman regularly congratulated GBCW volunteers on their sampling methods and easy availability. A Memorandum of Agreement (MOA) has been submitted to Governor's Council and the schedule of assistance has been created for 2002.

South Mill Pond Restoration Project

To improve fisheries and water quality during a habitat restoration project at South Mill Pond (SMP) in Portsmouth, the coordinator of GBCW assisted a team of volunteers with training and provided the non-federal match requirement. This project expanded GBCW educational experiences because it gave volunteers opportunities to assist scientists from Jackson Estuarine Laboratory with research and habitat restoration as well as being positive examples of adult mentors to the eighth graders of Portsmouth Middle School. Another result was the media exposure from newspapers, radio, and television, which publicized GBCW activities and volunteer opportunities.

Dr. Dave Burdick, Dr. Ray Grizzle, and Dr. Larry Ward have encouraged GBCW to seek more funding in order to join them on the next phase for improving habitat at SMP and keeping adult volunteers involved.

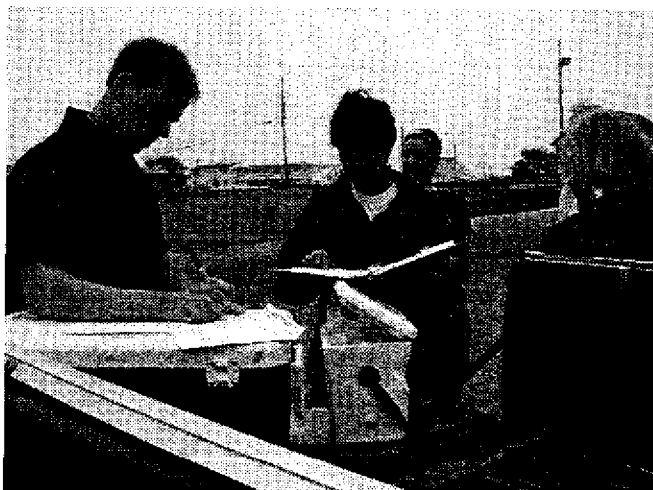
Web Site Expansion

Using a grant from the Davis Conservation Foundation, Bill Pagum transformed the GBCW web page into an expanded web site of more than a dozen pages in order to increase its visibility and utility. Tina Wells, a computer consultant, implemented the design at a reduced rate using Homepage software to assist GBCW. Kevin Ronkko is responsible for weekly updates and changes. The GBCW Ten Year Report is available on the world-wide web. Future plans include adding town by town summaries of the report with a link to the GBCW web site—www.gbcw.unh.edu to complete the requirements of the grant.

Future Plans

- Continue Basic monthly water quality monitoring of 21 sites at high and low tides around the Great Bay Estuarine System.
- Continue and expand the Phytoplankton Monitoring Program through a grant to the New Hampshire Coastal Program (NHCP).
- Work with the NHDES Shellfish Program, assisting in sampling, shoreline surveys, potential pollution source identification, and Isles of Shoals mussel collection.
- Identify and inventory instream and riparian habitats in need of restoration, with the New Hampshire Coastal Program (NHCP).
- Work with the City of Dover and the NHDES to monitor potential pollution sources related to stormwater in Dover, assist the City with its stormwater management plan; and detection of illicit discharges.
- Evaluate data use by various agencies and organizations.
- Update and expand Web Site .
- Assist St. Mary Academy students with projects for the Schools Without Walls, a program of the Gulf of Maine Council on the Marine Environment.
- Present of data findings to Newington, Portsmouth, New Castle as part of our community outreach.
- Enter GBCW data into EOS-WEBSTER—a program funded by NASA

At present, both the NHDES grant with Dover and the MOA with NHEP for work with NHDES Shellfish Program have been approved . We are hopeful that the NHCP grant will be approved.



C. Water Quality Data and Analyses

The Water Quality Indicators

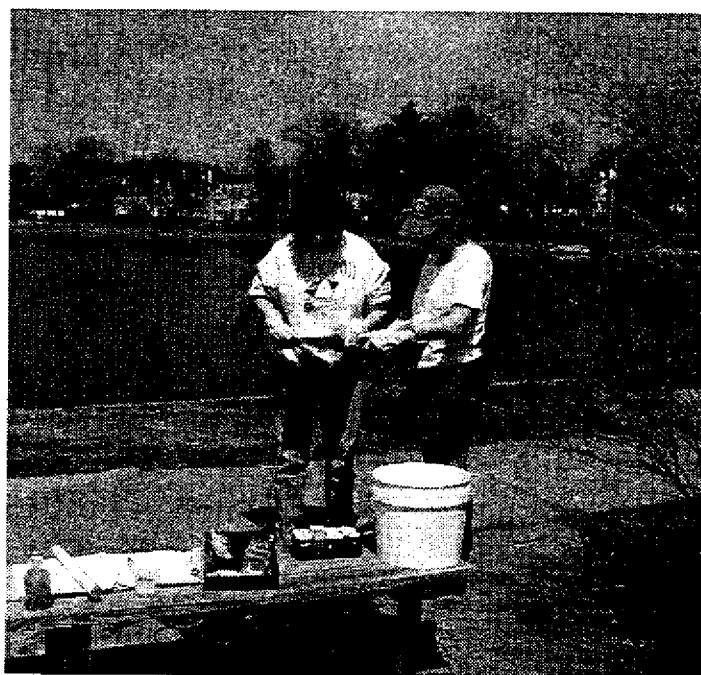
The GBCW measures several water quality parameters to track the overall health of the estuary. These indicators are standard in water quality studies, and the volunteers use measurement techniques that are commonly employed in monitoring programs throughout the country.

All surface waters in the state of NH are classified as either “Class A” (highest quality, potential drinking water supply, discharge of sewage or wastes prohibited) or “Class B” (second highest quality, suitable for fishing, swimming, and other recreational uses) by the NHDES. All NH tidal waters are Class B waters. General water quality standards for each class are established in state law (RSA 485-A: 8), and provide guidelines to determine if water is “clean” or “polluted.” Where applicable, GBCW data are compared to those standards.

Great Bay Coast Watch Field Data Sheets

At the beginning of the 2001 sample year, Steve Engstrom revised the GBCW data sheets to comply with a request from NH Fish and Game that GBCW volunteers monitor horse shoe crab populations at the sites. Data sheets used by GBCW were previously revised by Shanna Hallas (1997), Damon Burt (1996), and completely re-designed by David Waltz (1995).

The front of the data sheet includes the water quality parameters that the GBCW tests, while the back of the sheet leaves room for personal observations. This latter section is describes the site conditions and gives the volunteers the chance to report anything that may have an effect on water quality, such as birds, changes in the condition of the water surface, adjacent land use, recreational activities, etc. A sample of the data sheet is found on the next two pages.



GREAT BAY WATCH FIELD DATA SHEET

Sampling Team (First, last and mid. in.)

1) _____

2) _____

3) _____

Day _____ Date _____

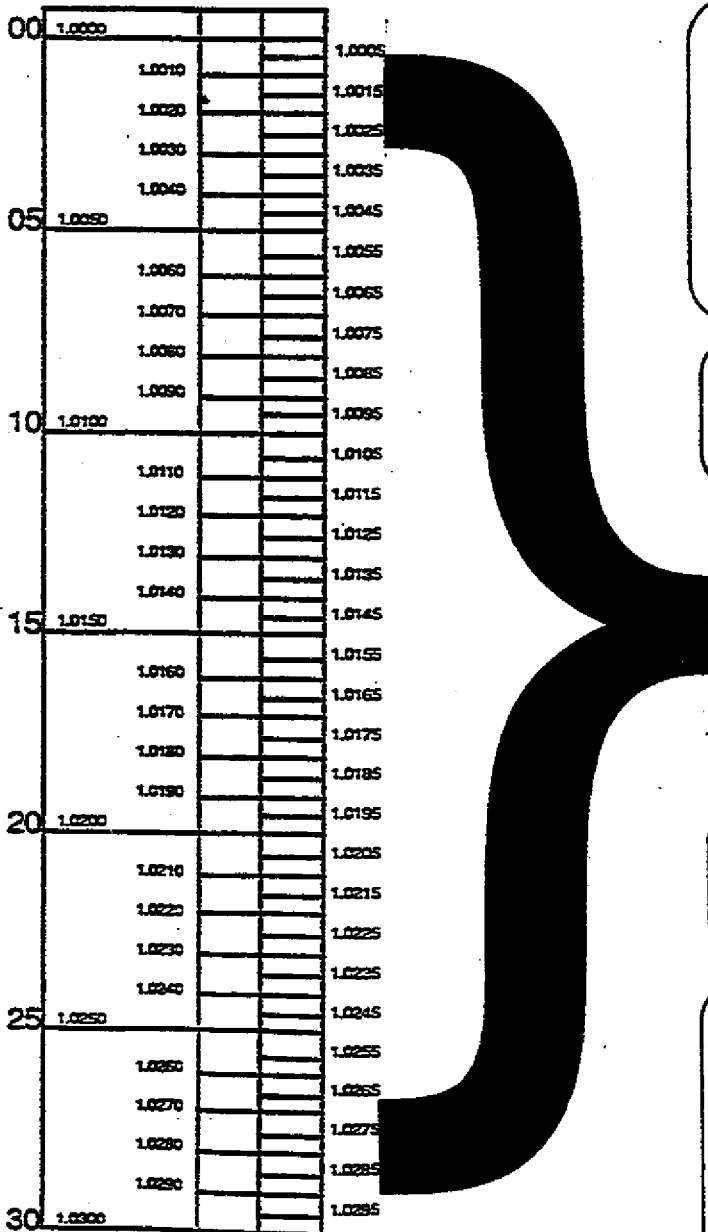
Tide _____ Time _____

(H/L) (Military)

Site Number: _____

Site Name: _____

Reading the Hydrometer



Air Temperature _____ C

Transparency

_____ cm _____ cm _____ cm

disappear appear average

Water Depth _____ cm

Water Temperature _____ °C

Thermometer # _____

Salinity

Hydrometer # _____

Water Temp (Jar) _____ °C

Density _____ g/cc

Salinity _____ ppt (from chart)

pH pH meter # Reading

_____ _____

Dissolved Oxygen

Bottle # _____

Add Test 1 _____ and Test 2 _____

Test 3 if difference is >0.3ml _____

TOTAL D.O.: _____

mg/L (ppm)

GREAT BAY FIELD DATA SHEET

PLEASE DESCRIBE THE CONDITIONS AT YOUR SITE TODAY:

Water: Calm _____ Ripple _____ Waves _____ Whitecaps _____

Weather: Clear _____ Partly Cloudy _____ Overcast _____ Fog/Haze _____
Showers _____ Downpour _____ Snow _____ Other _____

Activities: Fishing _____ Oystering _____ Boating _____ Hunting _____
Other _____

Fecal Coliform:

Person Taking Sample _____

Person Transporting Sample _____

PLEASE WRITE AN OBSERVATION NARRATIVE

Birds

Type _____ # _____

Type _____ # _____

Type _____ # _____

Other _____



Horseshoe Crabs seen

Rainfall in the
last 24 hours
was approximately
_____ in.

Time Spent Doing:

Field Work: 1) _____ 2) _____ 3) _____ 4) _____

Lab Work: 1) _____ 2) _____ 3) _____ 4) _____

Travel: 1) _____ 2) _____ 3) _____ 4) _____

Signature _____

(QA/QC Qualified)

Date: _____

TOTAL TIME _____ (*Time from home and/or school and back counts!!!)

Water Quality Parameters

The following section consists of explanations of the water quality parameters for which GBCW tests. The results collected in 2001 are shown graphically and by parameter at the end of the section. The Great Bay Coast Watch samples only during the months of April through November.

Water Temperature

Water temperature is a basic measurement included in water quality studies. Temperature affects the rates of chemical and biological activity, pH values and dissolved oxygen readings. Warmer water temperatures display slightly increased pH levels. Colder water has the potential of holding more dissolved oxygen. It should be noted however, that pH and dissolved oxygen levels are influenced by many other factors in addition to water temperature. Water temperature is a seasonal parameter with highs occurring in the late summer and lows in fall and early spring. Estuarine environments such as the Great Bay Estuarine System tend to exhibit cooler, less variable temperatures close to the ocean, and warmer, more variable temperatures in the inner estuary and tidal rivers.

Salinity

Salinity levels are calculated by measuring water temperature and density. Density is measured with a hydrometer. Using the water temperature and density readings, a chart is used to obtain the salinity reading expressed in parts per thousand (ppt: parts of dissolved solids per 1000 parts of seawater). Salinity is the total amount of dissolved solids in the water and is made up of all known elements. The salinity of the open ocean is approximately 35 parts per thousand (ppt), but in the Gulf of Maine, salinity is slightly lower at about 32 ppt due to regional rivers and run-off. eight rivers contribute water to the Great Bay Estuarine System. During the spring run-off, levels of salinity have been recorded as low as 0 ppt in the upper reaches of the estuary. Salinity may also range as high as 32 ppt. Tolerance of wide-ranging and sometimes rapidly changing salinity values determines, more than any other single factor, which species of plants and animals can survive in an estuary. Although salinity levels are higher at the mouth of the Piscataqua River, and generally become progressively lower as we move into the Great Bay proper, winds and tides cause Little Bay and Great Bay to be well mixed. Mixing occurs top to bottom, blending the warmer, fresher water that tends to float on top with the cooler, denser salt water brought in by the tides. Aquatic life is affected by varying levels of salinity. These levels determine when and where organisms can live in the estuary (Short et al. 1992). In estuaries, salinity readings vary with the seasons and weather conditions, as well as with the tides. Rain and snow melt cause rivers to swell, decreasing the salinity in the bay. As stream in-flow levels decrease and evaporation from the bay's surface increases during the summer months, salinity levels begin to rise. Salinity levels tend to drop again in mid to late fall as autumn rains increase river flows. This seasonal fluctuation is mirrored in the monitoring data from GBCW sites.

pH

pH is a measure of the hydrogen ion (H⁺) concentration in water (H₂O). The pH scale ranges from 0.0 to 14.0, with acidic waters having pH readings less than 7.0, and basic (or alkaline) waters having pH readings of greater than 7.0. A pH of 7.0 is a neutral (neither acidic or basic) reading. Distilled water has a pH reading of 7.0. Open ocean waters tend to have a pH just over 8.0, while fresh water in New Hampshire tends to be slightly acidic (less than 7.0). Estuarine waters, a mixture of fresh and salt water, generally have pH readings between 6.5 and 8.5. The pH levels in Great Bay may vary slightly over a year, but in general show little seasonal fluctuation. Large changes in pH can have a great impact on estuarine life, and readings well above or well below the normal range may indicate pollution. In particular, acid pollution is caused by the emissions of automobiles and coal-fired power plants. New Hampshire standards for Class B waters specify that pH readings should be between 6.5 and 8.0, unless naturally occurring. GBCW volunteers use an electronic "pocket" pH meter (Cole Parmer pH tester 2).

Dissolved Oxygen

Dissolved oxygen (DO) is one of the most important indicators of water quality for aquatic life. It is essential for all plants and animals inhabiting Great Bay Estuarine System. Dissolved oxygen is measured with a Micro-Winkler titration kit and measurements are expressed in milligrams of oxygen per liter of water (mg/L).

Table of Primary Factors Affecting DO Concentration

Factor	High	Low
Nutrient Loading	Decreases	Increases
Salinity	Decreases	Increases
Temperature	Decreases	Increases
Turbidity from Pollution	Decreases	Increases
Light	Increases	Decreases
Photosynthesis	Increases	Decreases
Wind and Waves	Increases	Decreases

Many conditions can affect DO as indicated in the table above. Temperature and salinity can increase or reduce DO. Warmer water holds less oxygen, as does salty water. Wind and wave action increases DO. Photosynthesis by phytoplankton and submerged aquatic vegetation can increase DO values. Lack of light decreases photosynthesis and therefore, DO. High turbidity (cloudiness of water) and food web responses to nutrient enrichment decrease DO values and may indicate possible pollution. Excessive nutrient loading can result in a large amount of organic matter in the water, and the decomposition of this material reduces the water's oxygen content. Half of GBCW sampling times are scheduled to occur when low tide is in the early morning. Low tide tends to reflect "worst case" conditions, when respiration by plants has occurred for an extended period of time and neither photosynthesis activity nor colder, high tide water are present to raise the oxygen levels.

While the overall oxygen content in the water is important in assessing the health of a water body, it is also useful to look at dissolved oxygen in terms of “percent saturation.” Percent saturation is the ratio of oxygen concentration that is in the water to the oxygen concentration that would be expected in the water if saturated, at given temperature and salinity. Expressing dissolved oxygen data in terms of percent saturation makes observations taken at different times from different sites comparable to one another. One might expect the highest obtainable percent saturation value to be 100 percent; however, “supersaturation” (values greater than 100 percent) can occur under certain conditions. Very high concentrations of oxygen are possible in areas with a great deal of aquatic vegetation, which produce oxygen through photosynthesis. Areas with strong wind and wave action can also add oxygen through entrainment of atmospheric oxygen into the water. New Hampshire standards for Class B waters specify that dissolved oxygen readings should be no less than 75 percent saturation for a period of twenty-four hours, unless naturally occurring.

The Great Bay Estuarine System appears to have healthy levels of dissolved oxygen, indicating that it is not experiencing a significant degree of “eutrophication,” as are some of the other estuaries in the country. Most sites showed average percent saturation values well above the Class B standard of 75%. Any saturations below 75% typically occurred at low tide, but all sites showed levels above 75% of oxygen at high tide, indicating the observed oxygen depletion is not persistent throughout the day. Low saturation levels less than 75% could indicate potential environmental impacts. While GBCW volunteers only sample from the water surface, the measurements are likely to be good indicators of the oxygen content in the entire water column. The physical characteristics of the estuary, such as relatively shallow depths and strong tidal currents, usually ensure good mixing of surface and bottom waters, especially in Great and Little Bays and in the Piscataqua River. Good mixing helps prevent persistently low oxygen conditions from occurring.

Transparency

Transparency (Secchi depth) measurements are used as a gauge of the clarity of the water. It is measured by lowering a standard white and black disk (Secchi disk) into the water until it no longer can be seen. Turbid conditions, resulting in less Secchi depth visibility, tend to increase in the tidal rivers and inner estuary, and then decrease nearer to the ocean and further away from the sources of turbidity. Excessive turbidity may indicate problems in the estuary. Erosion from shorelines and upland areas increases the turbidity of the water, as can plankton blooms caused by high levels of nutrients. Turbidity affects fish and other aquatic life by: 1) limiting photosynthetic processes and increasing respiration (oxygen used and carbon dioxide produced), 2) clogging and damaging of fish and shellfish gills by suspended particles, and 3) obscuring the vision of fish and shellfish as they hunt for food. Estuarine waters can exhibit a natural pattern of turbidity from suspended sediments and phytoplankton. If the upper waters have less than one percent of the light levels found at the surface, phytoplankton are not able to photosynthesize and sustain growth. Our important seagrass beds require at least 20% of the surface light to survive. Less transparency caused by increased sedimentation could also reduce oyster populations because oyster larvae must settle and grow on clean substrate surfaces.

Fecal coliform bacteria

Fecal coliform bacteria are used as an indicator of human sewage pollution. While fecal coliforms are found in the feces of all warm-blooded animals, their presence indicates that other bacteria and viruses that are more dangerous to humans may be also present. High numbers of coliforms can indicate pollution from improperly treated sewage effluent, waste discharges from boats, improperly functioning or failed septic systems, untreated urban storm water, runoff from agricultural operations, feces from wildlife, or other sources. The New Hampshire water quality standard for tidal waters uses enterococci, another type of bacterial indicator to determine if waters are safe for swimming. State standards for tidal shellfish waters do specify acceptable levels of fecal coliforms. GBCW uses a different procedure, thus direct application of GBCW data to shellfish water standards would not be appropriate. These standards can be used to give a general sense of contamination in the estuary. Fecal coliform tests are performed using the membrane filtration (plate count) method.

Note: In a set of bacterial data, the average value is calculated by computing the geometric mean, rather than the arithmetic mean. This is the conventional manner by which bacterial averages are reported. Unlike the arithmetic mean, the geometric mean more accurately reflects the nature, or “middle road” of a data set that has a great deal of variability in the observations (as is often the case with bacterial data). For example, consider a set of bacterial data comprised of 10 observations, with eight of the observations equaling two colonies per 100 ml and two observations equaling 500 colonies per 100 ml. This is indicative of relatively clean water with occasionally high bacterial levels, perhaps caused by wildlife defecating near the site. The arithmetic mean or average of this data set would be 102 colonies per 100 ml, which does not reflect the fact that most of the observations are quite low. The geometric mean of this data set would be six colonies per 100 ml; thus, the geometric mean is a better representation of the bacterial data set. For sites that indicate minimal variability, we also calculated the median (the middle number when all observations are ordered in increasing order) for typical measure of the bacterial counts.

In order to calculate geometric means for the GBCW data, some adjustments to the data were necessary. First, on several of the sample dates, there were no fecal coliforms detected (zero colonies per 100 ml of water sample). Zero values cannot be used in calculating geometric means, so these observations were changed to have fecal coliform counts of one colony per 100 ml and reported as <1 colony per 100 ml. The second adjustment to the data relates to those samples for which coliforms were too numerous to count (TNTC) the colonies on the plate. In the case of high values, the adjustment uses the minimum number of colonies known to be present. According to *Standard Methods* for fecal coliform procedures, a colony count between 20 and 80 is preferred. If a 100 ml of sample produced TNTC colonies then 60 was entered as the count. When a 10 ml or 1 ml water sample was used as the dilution and count was TNTC, 600 and 6000 respectively were reported since these would be the calculations for colonies per 100 ml. By these methods, we are prevented from overestimating high counts that could not be documented. When calculating the medians for the GBCW data, adjustments to those observations that were too numerous to accurately count were calculated using the same formula implemented for the determination of geometric means. Zero values were allowed for calculating the median.

2001 Table of Fecal Coliform Geometric Means vs. Medians***

Site Name	Site #	Low Tide		High Tide	
		Geometric Mean**	Median**	Geometric Mean**	Median**
Peninsula	1	17	31	3	2
JEL	2	4	6	2	2
Lamprey River	3	42	30	19	26
Depot Road	4	*	*	7	15
PCC	5	24	74	5	6
Fox Point	6	1	1	3	3
Cedar Point	7	6	4	2	1
Neal	9	71	70	23	40
Clark	10	10	10	2	1
CML	11	2	2	2	1
STP	12	1	1	4	6
Marina Falls Land.	13	14	20	8	20
Fowler	14	5	4	7	6
Patten's Yacht Yard	15	2	2	2	0
Exeter Docks	16	370	700	255	370
Dover Foot Bridge	17	64	120	31	90
Maplewood Ave	18	14	20	5	0
Bartlett Ave	19	97	130	193	180
Junkins Ave	20	69	115	39	110
Pleasant St	21	35	30	8	10
Little Harbor	22	*	*	3	0

* There is no sampling at sites 4 and 22 at low tide.

** Measurements made in colonies per 100 ml of sample.

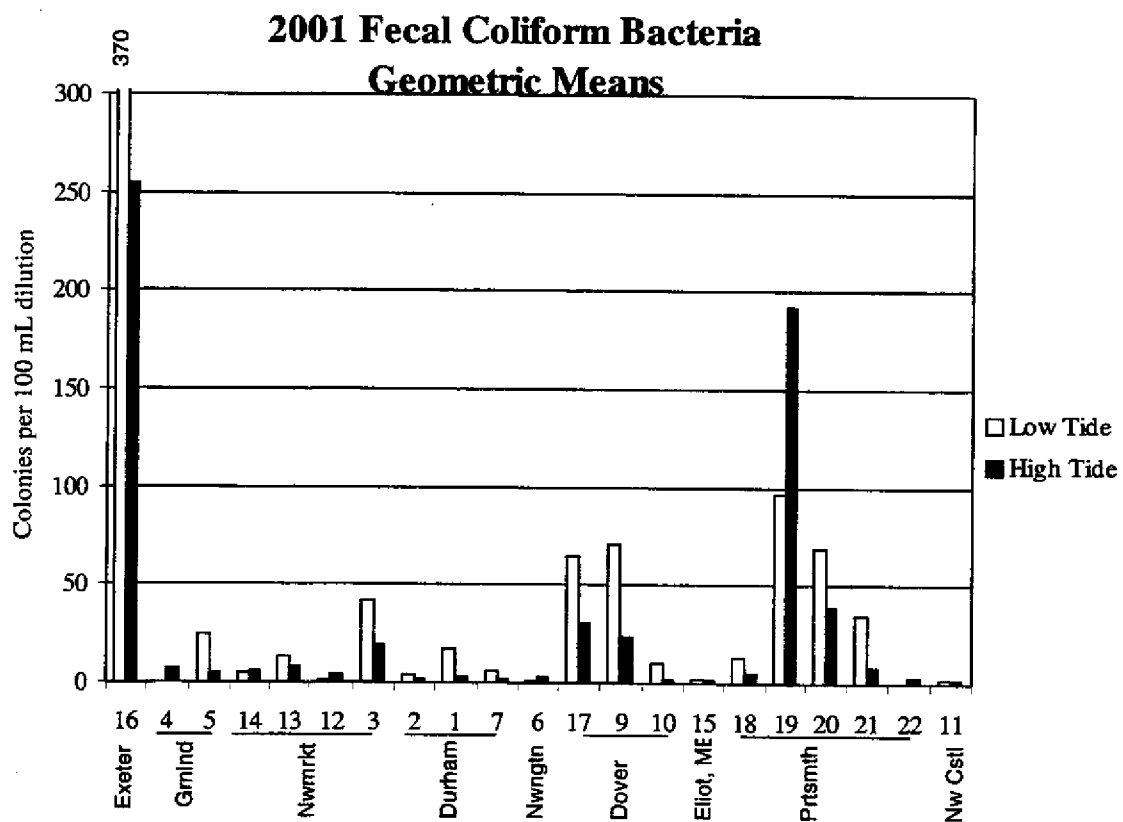
*** No fecal coliform samples were recorded for July

Some of the most commonly asked questions that we hear are “Are the bacteria levels in the estuary too high?” “Is it safe to swim in the Great Bay?” “Are the shellfish safe to eat?” It is important for the reader to understand the intended purpose of the GBCW monitoring when asking these questions. The volunteers’ data are useful for giving generalized information about water quality in the Great Bay Estuarine System, identifying “hot spots” where state/local regulators should investigate further and tracking changes in the water quality of the estuary over time. GBCW monitoring and data might also prove useful in locating the sources or activities that are creating the pollution that affects shellfish beds. Many of the above questions are specific “regulatory” issues that are best answered by the regulators themselves. For example, state regulations use enterococci as a bacterial indicator, not fecal coliforms, for determining if tidal waters are safe for swimming. Direct comparisons between the two cannot be made. Determining if waters are safe for shellfish harvesting is a complicated process that involves much more than taking water samples. Real and potential shoreline sources of pollution must be evaluated and other factors that affect the performance of the pollution sources and their effects on shellfish beds (hydrographic, meteorological, and other influences) must be determined. Furthermore, water samples must be tested by a laboratory certified by the U. S. Food and Drug

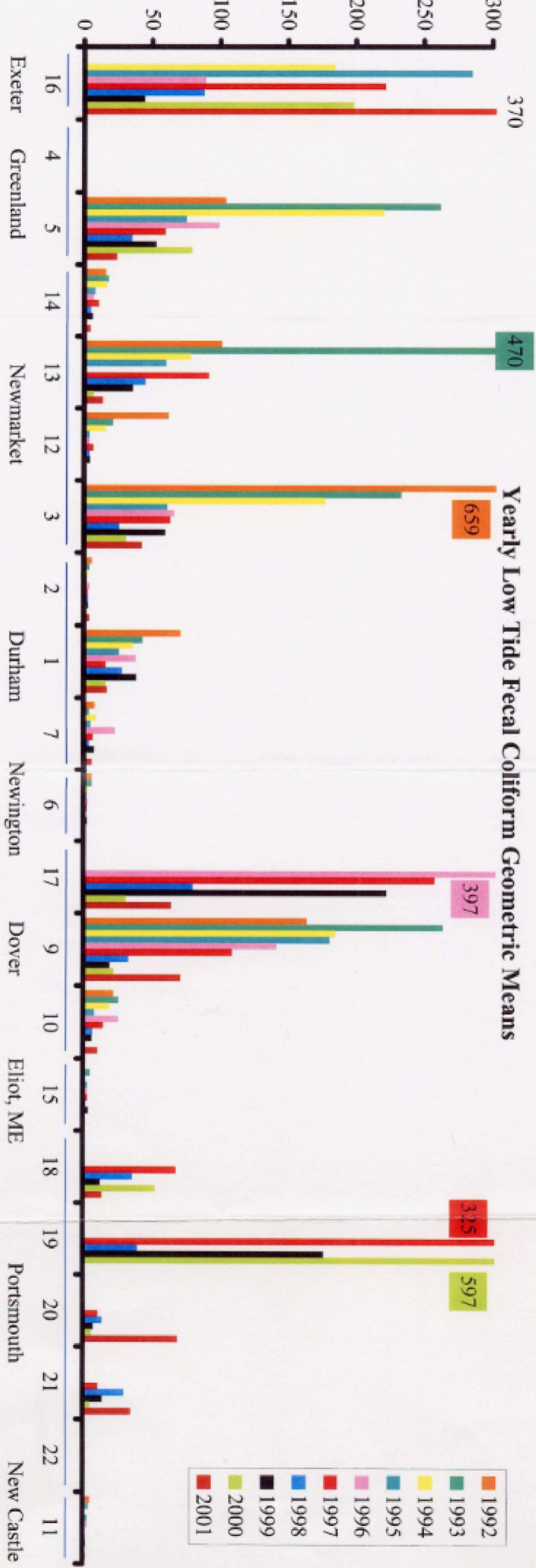
Administration, using specific analytical methods that are different from those used by the GBCW. Thus, it would be inappropriate for one to use the bacterial data generated by GBCW to make a definitive conclusion on the safety of shellfish beds.

GBCW data can be viewed, however, in the context of water quality standards for shell-fishing to get a general sense of how clean or polluted the waters of the estuary are. Shellfish water regulations state that for an area to be classified as "Approved" (harvesting can occur at any time, regardless of weather conditions or other factors), the geometric mean of several samples should not exceed 14 fecal coliform colonies per 100 ml, and not more than 10 percent of the samples should have counts that exceed 43 fecal coliform colonies per 100 ml. Sites 2, 6, 10, 11, 12, 15, and 22 pass this test based on the GBCW data collected during the 2001 season. Shellfish water quality criteria are very strict, and although many of the sites would not meet the "Approved" classification, waters determined to be unsafe for shellfish harvesting are not necessarily severely polluted and may be perfectly safe for other activities, such as swimming.

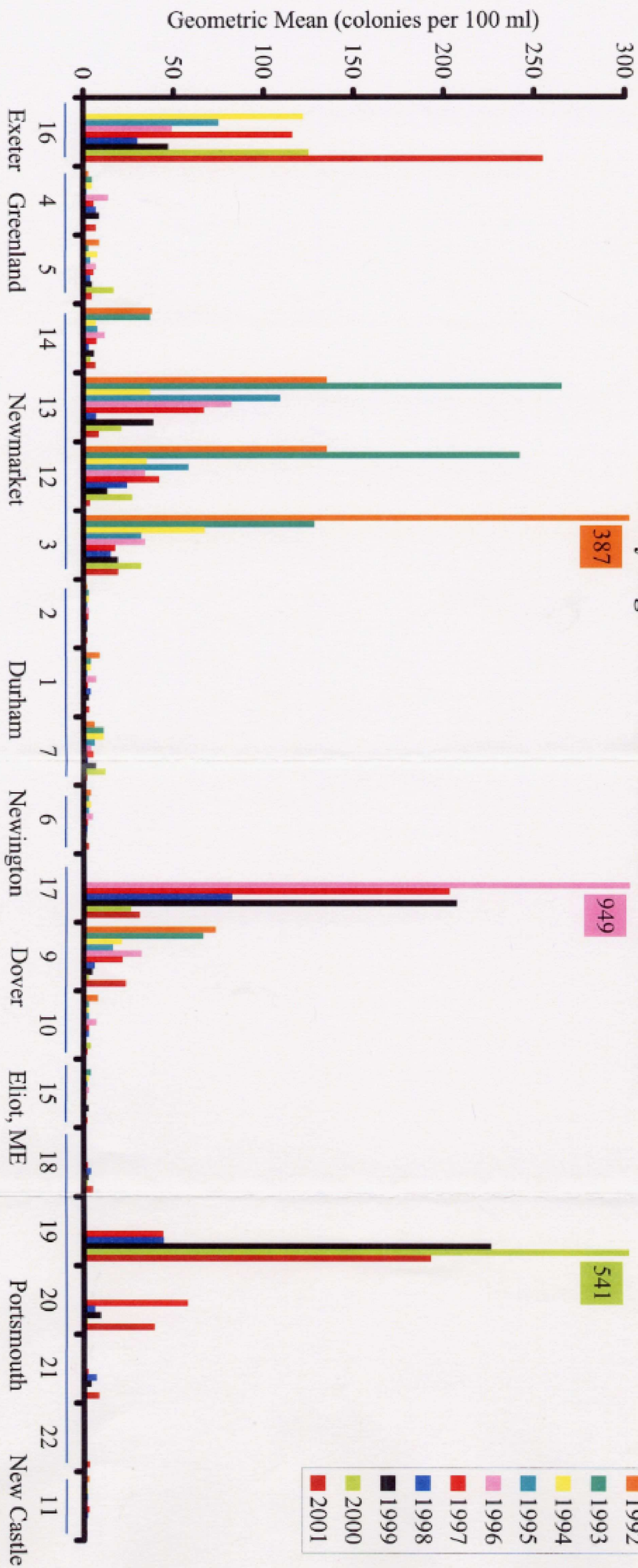
Fecal coliform data collected in the 2001 season reflected continuing interesting trends which were previously observed and reported in the ten-year report. Rainfall can affect fecal coliform counts, often elevating the numbers after rain events. Weather stations in Durham and Greenland reported below average rainfall amounts during the sampling months reflecting the onset of a severe drought.



Geometric Mean (colonies per 100 ml)



Yearly High Tide Fecal Coliform Geometric Means



D. Summary of Great Bay Coast Watch Site Information

Composite Site Data

Table of Composite Site Data for 2001

Parameter	Units	Low Tide	High Tide
Water Temperature	degrees Celsius	16.2	17.1
Salinity	ppt	16.3	19.9
Dissolved Oxygen	ppm	7.7	8.6
Saturated Oxygen	%	86.6	99.2
pH		7.4	7.5
Fecal Coliform	counts per 100 ml	45	30
Transparency	meter	1.00	1.65
Depth	meter	1.52	2.86
Air Temperature	degrees Celsius	16.9	21.1

The values for composite site data are based on averaging values of all the sites for each site parameter. For the parameter, fecal coliform, the value is a simple average of all the geomeans from each site.

The oxygen saturation was 86.6 percent at low tide, above the state water quality standard of 75 percent. Fecal coliform values were 45 counts per 100 ml at low tide and 30 counts per 100 ml at high tide. Transparency at high tide was good at 1.65 meters. The depth at high tide was 2.86 meters. Water temperatures were 16.2 °C and 17.1 °C for low and high tide respectively. Salinity values were 16.3 ppt and 19.9 ppt for low and high tide, respectively. The composite temperature and salinity values were higher than those from the 2000 season due possibly to the drought that occurred during the 2001 season. During the 2001 sampling season, 19 inches of rain fell in the Great Bay area, 11 inches less than in a normal season.

Site Observations

Several interesting events occurred this sampling season that can be readily noticed in our data. This year was a drought year that has had a great effect on the salinity in the bay, with abnormal highs occurring in September. Look for changes in clarity and depth at sites with normally high fresh water inflow. Some fecal coliform results in October were at an unusual high due to a high amount of rainfall just before the low tide sampling and an early morning overflow at the Portsmouth Waste Water Treatment Plant. Data sheets this year included the Horseshoe Crab counts for the first time. Although they are not reported here, the counts have been requested by New Hampshire Fish and Game for their 2001 Horse Shoe Crab Annual Report to the Atlantic States Marine Fisheries Commission. We are listed as a contributor and are pleased to be a part of this important work. In addition, take notice of the monitors' comments, which provide interesting looks at things that can greatly affect our results. Not all comments have been printed, due to time and space considerations, but we have tried to include those comments, which may in part explain some data results.

Site	Date	Tide	Comments
2	4/24/01	L	1 JEL pipe has seawater running out of it.
2	5/23/01	L	20+ horseshoe crab nests seen on shore by little cove – found eggs in many of the nests.
2	8/20/01	L	Tons of mud snails on the mudflats in the little to the right of JEL.
2	10/17/01	L	2 gushing JEL pipes.
2	10/17/01	H	2 JEL pipes gushing.
2	11/01/01	H	15 boats with motors, 1 rowboat.
2	All Season	L and H	Summary – Heavy boat traffic.
3	4/24/01	L	Fecal coliform sample out of bucket – canoe dock not in yet.
3	7/23/01	H	2 children and dog across from site.
3	All Season	L and H	Summary – a very quiet site.
4	8/20/01	H	Starch was syrupy when added to solution. Created black mother, after shaking was not as syrupy, but still “UGLY” in sample solution.
5	All Season	L and H	Construction, hornets.
10	7/23/01	H	Lots of boats went by making the floating dock shaky!
10	9/18/01	L	Red fox in driveway.
10	11/01/01	H	Heard an eagle cry – looked over the water and saw a bald eagle! Heard it again. Cool!
11	All Season	L and H	Coast Guard Station – high boating traffic area.
12	6/21/01	H	Red fox (baby)
13	4/24/01	L	Current strong enough to move Secchi disk. Lot of water going over falls.
13	5/23/01	H	Alewives jumping & feeding along wall.
13	6/21/01	L	Foam on surface of water.
13	7/23/01	L	Brown foam along edges of river.
13	8/20/01	L	Water very murky and appeared to have an oily layer subsurface.
13	11/01/01	H	White suds coming down channel from dam falls.

Site	Date	Tide	Comments
19	4/24/01	L	Water flowing from pipe nearest bridge.
19	4/24/01	H	Constant drainage from storm drain.
19	6/21/01	L	Turtle! Looked like a snapping turtle. 10 – 12 inches long. Storm drain flowing, water still flowing out form under bridge.
19	6/21/01	H	Storm drain flowing. Color of water – darker than usual – yellowish/brown tint.
19	7/23/01	H	Inch long fish in school by site.
19	8/20/01	H	Tide very high.
19	9/18/01	H	A film of dirt (sandy-like) was floating on the water.
19	10/17/01	L	Water very cloudy, probably due to rain during previous night – also more water coming through than usual.
19	10/17/01	H	Lots of tiny fish that looked like tadpoles coming to the surface.
19	10/17/01	6:00 AM	Starting at 6:00 AM, Portsmouth had a pretty good discharge of sewage from the Deer Street pump station (near the salt piles) to the Piscataqua River. This went on all day and into 10/18... if your FC are high, that might [have contributed]
19	11/01/01	L	Water was moving more swiftly than we normally see at low tide.
19	All Season	L and H	Traffic
21	4/24/01	L	Dam closed
21	4/24/01	H	Dam closed. Water moving up fast in (just short of slack tide). Reversed at 13:45 to outflow.
21	5/23/01	L	Sluice gate open, has been open for approximately a week or so, maybe more. Water still moving out when we sampled – almost slack at about 8 AM.
21	5/23/01	H	Sluice gate closed slack tide appeared to be at about 14:20 rather than the 13:18 that chart said.
21	6/21/01	L	Dam closed sometime Wed. night or Thurs. morning early. Dam had been open since Sunday's 3-inch thunderstorms. Smelled at low tide Mon. Tues, Wed it was much better.
21	6/21/01	H	Dam closed
21	7/23/01	L	Tide gate to SMP is closed – appears to be broken and closed at all times.
21	7/23/01	H	Dam was ½ closed. Opened after sample was taken.
21	8/20/01	L	Dam closed, water high.
21	8/20/01	H	Dam open, missed high tide, arrived 1:55 going out, had just changed.
21	9/18/01	L	Dam is closed.
21	9/18/01	H	Dam open.
21	10/17/01	L	Dam open.
21	10/17/01	H	Dam open.
21	11/01/01	L	Dam open.
22 QAQC	9/18/01	H	They did their draw at lunchtime (12:30-1:00). I got there at 1:30, helped with the DO and then did a draw. I couldn't reach the water to do a fecal sample.
16 QAQC	6/21/01	L	1 dead crawfish on mud, mussel beds, 1 green crab.

E. The General Characteristics of Each Great Bay Coast Watch Site

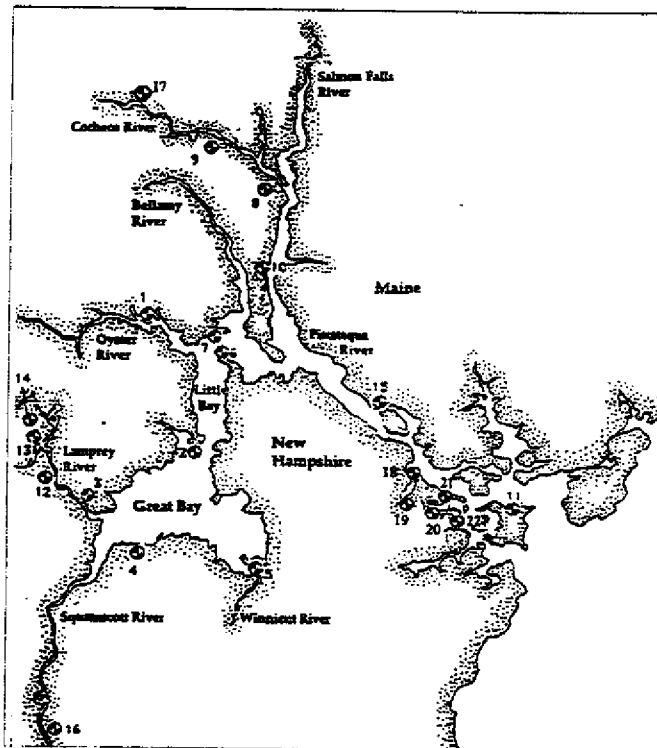


Table of Great Bay Coast Watch Sites: Locations, Towns and Year Started

Site Name	Site #	Location	Town	Year Started	Comments
Peninsula	1	Oyster River	Durham	1990	
JEL	2	Great Bay	Durham	1990	
Lamprey River	3	Lamprey River	Newmarket	1990	
Depot Road	4	Great Bay	Greenland/ Stratham	1990	High tide only as of 1993
PCC	5	Winnicut River	Greenland/ Stratham	1990	
Fox Point	6	Little Bay	Newington	1990	
Cedar Point	7	Little Bay	Durham	1990	
Rakoskes'	8	Piscataqua River	Dover	1990	Inactive as of 1992
Neal's	9	Cochecho River	Dover	1990	
Clark's	10	Piscataqua River	Dover	1991	
CML	11	Piscataqua River	New Castle	1991	
STP	12	Lamprey River	Newmarket	1992	
Marina Falls Land.	13	Lamprey River	Newmarket	1992	
Fowler's	14	Lamprey River	Newmarket	1992	
Patten Yacht Yard	15	Piscataqua River	Eliot, Me	1993	
Exeter Docks	16	Squamscott River	Exeter	1994	
Dover Foot-Bridge	17	Cochecho River	Dover	1996	
Maplewood Ave.	18	North Mill Pond	Portsmouth	1997	
Bartlett Ave.	19	North Mill Pond	Portsmouth	1997	
Junkins Ave.	20	South Mill Pond	Portsmouth	1997	
Pleasant Ave.	21	South Mill Pond	Portsmouth	1997	
Little Harbor	22	Little Harbor	Portsmouth	1998	High tide only

Town and Site Descriptions

This section characterizes each site in the GBCW network. For each site, we have provided a brief description of the sampling location and a summary of water quality statistics using all of the data in each site's records (Appendix I). The sites are generally grouped by river system, with sites furthest from the ocean discussed first. This grouping also separates each municipality so that a clear picture of the estuarine water quality can be provided for each town.

Exeter, Stratham, and Greenland

Volunteers cover the one site in Exeter, and two sites in the town of Greenland.

Site 16: Exeter Town Docks

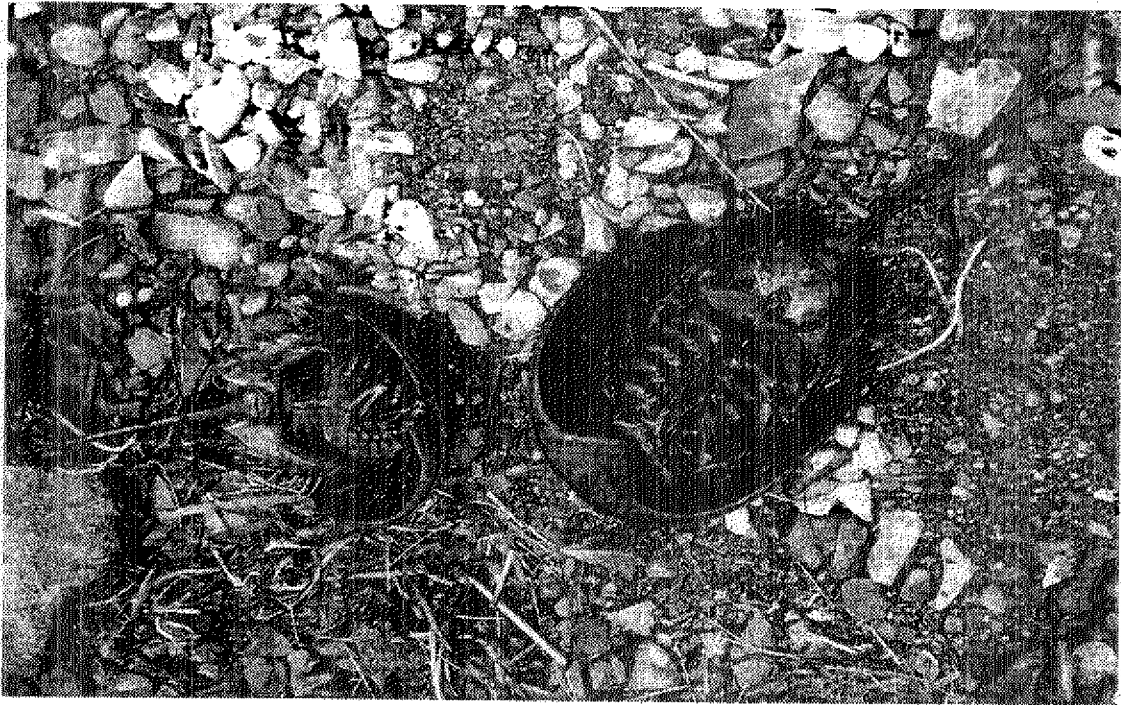
This site is on the Squamscott River, located downstream of the tidal dam in downtown Exeter and upstream from the crew docks at Phillips Exeter Academy. It was added to the program in 1994 and is one of our farthest upstream sites. Over the last eight sampling seasons, this site has one of the highest average temperature values and tidal temperature difference values: 16.8° C at low tide and 18.7° C at high tide. This season, the average temperature values were slightly higher: 17.6° C at low tide and 19.6° C at high tide. The values for percent saturation of dissolved oxygen at low tide was 87.6 percent, well above the class B standards. Salinity increased slightly to 5.2 ppt at high tide. The transparency at low tide was 69 cm, while the high tide transparency was 96 cm. Low tide pH was 7.2 and at high tide was 7.6. Fecal coliform counts for this season have increased from last season, with a low tide geometric mean of 370 and a high tide geometric mean of 255. These values were the highest noted in the 2001 sampling season.

Site 4: Depot Road, Sandy Point

Site 4 is located on the southern shore of Great Bay at the Great Bay National Estuarine Research Reserve's Sandy Point Discovery Center. Because of the extensive mud flats exposed at low tide at this location, samples can only be collected at high tide. The average temperature was 18.0° C, warmer than at nearby Adam's Point. The salinity at high tide was 24.3 ppt, which is average for this site. Site 4 had a high tide average pH of 7.6. The high tide dissolved oxygen percent saturation averaged 104.8 percent. High tide transparency was steady at 49 cm, but this was the maximum depth at the site. The fecal counts at high tide produced a geometric mean of 7 counts. The overall quality of the water is quite good, with bacteria levels an order of magnitude less than the ranges observed at the Exeter docks.

Site 5: Winnicut at Portsmouth Country Club

Site 5 is located at the mouth of the Winnicut River. It sits on the east bank of the river at the Portsmouth Country Club. The County Club's #4 fairway leads down to where GBCW volunteers sample. The average temperature at low and high tide was 16.5° C and 18.8° C, respectively. This tidal temperature difference is one of the highest in the GBCW network. Dissolved oxygen percent saturation at low tide was 76.3 percent. On many sampling dates, saturation levels were below the Class B standard of 75 percent, most likely due to natural causes according to Dr. Dave Burdick. High tide dissolved oxygen saturation averaged 102.4 percent. Salinity levels reflect trends due to the site's tidal variability, averaging 13.4 ppt at low tide, and 23.2 ppt at high tide. Low tide pH readings were 7.4, while high tide readings were 7.7. Transparency remained consistently near 92 cm at high tide and water depth averaged 103 cm. Fecal coliform counts at low tide were a geomean of 24, while high tide counts had a geomean of 5, slightly lower than the preceding year.



Newmarket

GBCW monitors four sites in the town of Newmarket on the Lamprey River.

Site 14: Fowler's

Site 14, the only freshwater site in the GBCW network, is just upstream of the tidal dam (and upstream of downtown Newmarket) at the Fowler's dock on the Lamprey River. There are no low and high tide fluctuations at this site, so the difference in sampling times is described by AM (when all other sites are measuring low tide) and PM (when all other sites are measuring high tide). The water temperature averaged 18.4° C for AM readings and 19.5° C for PM readings. Dissolved oxygen saturation was 79.6 percent for AM readings, and 80.7 percent for PM readings. Salinity in the AM and PM readings were 1.0 ppt, indicating fresh water. Transparency was average for this site at 168 cm for both readings. The pH readings for both AM and PM averaged 7.5. For both morning and afternoon samples, the fecal coliform counts had geomeans of 5 and 7, respectively, similar to counts measured in 2000.

Site 13: Marina Falls Landing at Newmarket

Site 13 is located at a small boat docking facility upstream of the town dock in downtown Newmarket and on the Lamprey River. This site is upstream of the wastewater treatment facility, and downstream of Fowler's and the dam marking head-of-tide. Temperature at this site was 17.7° C for low tide and 19.3° C for high tide. The dissolved oxygen percent saturation of 90.5 percent at low tide and 99.2 percent at high tide was the highest of all the sites on the Lamprey River, possibly due to the aeration effect of the dam. The pH averaged 7.3 at low tide and 7.5 at high tide. Salinity at this site was less than 5 ppt for both tidal cycles. Transparency stayed steady at 125 cm during high tide. Continuing from the past three years, the fecal coliform geomean counts remained low, averaging 14 at low tide and 8 at high tide.



Site 12: Newmarket Waste Water Treatment Facility

Site 12 is located on the shoreline just below the Newmarket Waste Water Treatment Facility (WWTF) and downtown Newmarket on the Lamprey River. Substantial mud flats require that low tide samples be taken close to the outlet of the treatment plant. Thus low tide values are an indication of the performance of the outflow pipe from that facility. This site is downstream of the boat docking facility Marina Falls Landing and upstream of Towne's family dock.

Average low tide temperatures at this site were the highest for the Lamprey River: 18.3° C at low tide, with 19.1° C at high tide. The dissolved oxygen percent saturation was noticeably variable between low tide and high tide. The low tide value was 67.5 percent, but that is the effluent, not the river water. The high tide values were well above the Class B standard at 97.3 percent, following a three year trend. Salinity, was relatively low at an average of 0.5 ppt at low tide and 4.4 ppt at high tide. The high tide transparency was 85 cm, however, the average depth for high tide was 98 cm. The pH at both tides was 7.1, the lowest of all the sites on the Lamprey River. The fecal coliform geomeans at low tide were 1, while the high tide counts had a geomean of 4, similar to previous seasons. In previous years, fecal coliform counts at the WWTF have been some of the lowest in the GBCW network due to chemical treatment upgrades at the plant.

Site 3: Towne's dock (formerly Weinert's dock)

Of the four GBCW sites on the Lamprey River, Site 3, which is located one lot downstream from Weinert's dock, is closest to where the Lamprey River enters Great Bay. The water temperature at this site was similar to all of the other sites along this river, averaging 17.4° C at low tide and 19.1° C at high tide. The dissolved oxygen percent saturation was 87.4 percent during low tide and 99.9 percent during high tide. The salinity at this site was 10.4 ppt at low tide and 11.6 ppt at high tide, the highest of the Lamprey River sites. Transparency averaged 95 cm for high tide. Low and high tide pH readings averaged 7.2. This site's fecal coliform geomeans were 42 and 19 for low and high tide, respectively. Annual low tide fecal coliform have dropped considerably during the last eight years, from 760 counts in 1992 to 31 counts in 2001.

Durham and Newington

The GBCW monitors one site in Newington (Fox Point) and three sites in the town of Durham (one site on the Oyster River, one site on Great Bay, and one site on Little Bay).

Site 2: Jackson Estuarine Laboratory

Site 2 is located at the University of New Hampshire's Jackson Estuarine Laboratory on Adams Point, approximately where Little Bay and Great Bay meet, at the eastern tip of Great Bay. Comparing this site with the GBCW sites in Greenland (Depot Road and Portsmouth CC) give us a good overall picture of the water quality of Great Bay. Average low tide temperature was 16.3° C and average high tide temperature was 15.8° C. The dissolved oxygen percent saturation was 95.8 percent at low tide, and 99.8 percent at high tide. The salinity was 26.1 ppt at low tide, with 27.3 ppt at high tide. Transparency averaged 208 cm at this deep water site with a high tide depth of 428 cm. The fecal coliform levels remained steady and low, with low and high tide geomeans of 4 and 2 counts per 100 ml, respectively.

Site 1: Peninsula

Site 1 is located at the Smith's dock, upstream of Bunker Creek on the north bank of the Oyster River. This site is downstream of the Durham Waste Water Treatment Facility, and relatively closer to the river's tidal mouth than to the tidal dam in downtown Durham. The average water temperature was 17.1° C at low tide and 17.8° C at high tide, slightly higher than at Fox Point and Cedar Point. The dissolved oxygen percent saturation was 92.0 at low tide and 101.5 at high tide. The salinity is steady at this site, and was 21.9 ppt at low tide and 29.9 ppt at high tide. Transparency measured an average of 177 cm at high tide. The fecal counts had geomeans at 17 at low tide and 3 at high tide, similar to 2000 and an improvement over previous years.

Site 7: Cedar Point

Site 7 is located at the Rosholt's dock on Cedar Point, across Little Bay from Fox Point. This site is on the north shore of Little Bay between the mouths of the Oyster and Bellamy rivers. The average temperature at this site was 15.3° C at low tide and 13.9° C at high tide. These temperatures were similar to the temperatures directly across the bay at Fox Point. The dissolved oxygen percent saturation was 86.0 percent at low tide and 99.0 percent at high tide. The salinity was 27.7 ppt at low tide, while the salinity at high tide was 28.5 ppt, among the highest for all the sites. High tide transparency was 261 cm, also among the highest measurements. The pH for this site averaged 7.5 at both tides. The fecal coliform geomean at low tide was 6 counts, while the high tide geomean was 2 counts.

Site 6: Fox Point

Site 6 is located at Fox Point, where Little Bay's north-south orientation takes a sharp bend to the east. The mouth of the Oyster River is located just to the west, while the mouth of the Bellamy River is just to the north. The Fox Point site is located directly across Little Bay from Cedar Point.

Average temperatures at this site were 15.8° C at low tide and 14.2° C at high tide. The dissolved oxygen percent saturation was 96.2 percent at low tide and 96.3 percent at high tide, well above the Class B standard of 75 percent. Salinity was 26.9 ppt at low tide and 28.5 ppt at high tide. Transparency at this site was very similar to Cedar Point, with an average of 248 cm at high tide. The fecal coliform geomeans were 1 at low tide and 3 at high tide, similar to the results at site 7.



Dover

The GBCW monitors three sites in the city of Dover. Two sites are located on the Cocheco River, while the other is on the Piscataqua River.

Site 17: Dover Footbridge

Site 17 was started in August of 1996 and is sampled from the new Dover footbridge, near Central Ave. in downtown Dover. This upstream site had the lowest salinity of all Dover sites. The average temperature at low tide was 16.4° C and 20.3° C for high tide. The dissolved oxygen percent saturation at low tide was 92.6 percent, while the high tide dissolved oxygen saturation was 99.7 ppt, considerably higher than the other two Dover sites. The salinity was 2.1 ppt at low tide and 2.9 ppt at high tide. The pH averages for both tides was 7.3 at this site. Transparency at high tide was 150 cm, remaining consistent with previous sampling season. The fecal coliform geomeans were 64 counts at low tide, and 31 counts at high tide, similar to that of 2000 and lower than during 1999.

Site 9: Neal's

Site 9 is located at the Neal/Williams property, near the mouth of Fresh Creek on the Cocheco River. It is upstream from the Dover Waste Water Treatment Facility, and between the footbridge and the Clark's site. Average temperatures at Site 9 are 17.6° C at low tide and 17.9° C at high tide. The dissolved oxygen percent saturation was 86.1 percent at low tide and 94.4 percent at high tide. Salinity was 10.1 ppt and 15.6 ppt for low and high tides, respectively. These values were between the observed upstream level at the footbridge and downstream at Clark's. Transparency at this site was 163 cm at high tide. This site's pH averaged 7.3 for both tides. The fecal coliform levels were 71 counts at low tide and 23 at high tide. These levels increased slightly from the 2000 season.

Site 10: Clark's

Site 10 is located at the Clark's property off Dover Point Road, downstream of Neal's and upstream of the Patten Yacht Yard. This site is below the outfall of the Dover Wastewater Treatment Facility and Sturgeon Creek. The creek empties into the Piscataqua River from the Maine side. The site was moved from the nearby Dube property in 1996. Average water temperatures at Clark's were 18.3° C at low tide and 16.8° C at high tide. The dissolved oxygen percent saturation was 85.3 percent during low tide and 99.4 percent during high tide. Salinity was, as expected, lower than the downstream Patten Yacht Yard, yet higher than Neal's (18.2 ppt at low tide and 25.3 ppt at high tide). Transparency at high tide averaged 201 cm. The pH averaged 7.4 at low tide and 7.8 at high tide. The fecal coliform had a geomean at 10 counts at low tide and 2 at high tide, similar to 2000's geomeans.

Eliot, Maine

GBCW volunteers from Marshwood High School monitor one site in the town of Eliot, Maine.

Site 15: Patten Yacht Yard, Inc.

Site 15 is located in the lower Piscataqua River, upstream from Portsmouth, at the Patten Yacht Yard, Inc. dock in South Eliot, Maine. Key indicators of water quality at this site are strongly influenced by tidal exchange. Temperature readings were quite low (second coldest), and salinity readings are typically the highest in the network. Average temperatures were 14.0° C at low tide and 12.9° C at high tide. The dissolved oxygen percent saturation was a steady 93.7 percent at low tide and 105.6 percent at high tide, well above the Class B standard of 75 percent. Salinity was 28.6 ppt at low tide and reached 31.6 ppt at high tide. Both low and high tide pH readings averaged 7.7. Transparency at low tide was 217 cm and at high tide was 398 cm. The fecal coliform geomeans remained consistently low, with counts of 2 at both tides.



Portsmouth

GBCW monitors six sites in the city of Portsmouth. Two sites each are located on South Mill Pond and North Mill Pond. Both ponds are tidal, however South Mill Pond has tide gates that are periodically lifted to drain the system. An additional Portsmouth site, the newest in the network, is located at the Little Harbor School in Little Harbor, south of the main harbor.

Site 18: Maplewood Avenue

North Mill Pond is located on the west side of the Piscataqua River, just upstream from downtown Portsmouth and the Port of New Hampshire. Salt piles owned by Granite State Minerals are located adjacent to the pond. Site 18 volunteers sample at a floating dock on the eastern side of the Maplewood Avenue Bridge near Cindy Ann Cleaners. This site's proximity to the ocean accounts for its cold average temperature readings (13.4° C at low tide and 14.7° C at high tide). Small differences in temperature at high and low tides are typical of open ocean sites. The dissolved oxygen percent saturation was 80.6 at low tide and 98.2 percent at high tide. The pH at site 18 averaged 7.5 at low tide and 7.8 at high tide, slightly higher than 2000's averages. This site usually shows high salinity, with little variation (this season's 25.8 ppt average at low tide and 29.7 ppt average at high tide were typical). Transparency was 204 cm at high tide, with an average depth of 246 cm. Fecal coliform geomeans were 14 counts observed at low tide and 5 counts observed at high tide. These readings are the lowest observed since sampling began at this site in 1996.

Site 19: Bartlett Avenue

Site 19 is located at the far end of North Mill Pond near Ricci's Supply Company, Inc. Average temperatures at Site 19 were slightly higher than at Maplewood on the other side of the pond (15.9° C at low tide and 17.9° C at high tide). The dissolved oxygen percent saturation was 93.6 percent at low tide and 99.7 percent at high tide. Salinity was markedly lower than at Maplewood (1.2 ppt at low tide and 9.6 ppt at high tide). The inland end of the pond is at the Hodgson Brook inlet and therefore the water is less mixed with tidal waters, yielding salinity readings indicating fresh water. The average high tide transparency was 70 cm with a depth of 82 cm at high tide. The average pH was 7.5 and 7.7 for low and high tides, respectively. Similar to 1999, fecal coliform geomeans revealed very high counts. While geomeans at low tide were 177 and at high tide 226 in 1999, the counts for 2000 were considerably higher: 597 and 541 counts, respectively. For the 2001 season, the geomeans at low tide for this site were 97 and 193 at high tide. These were the second highest bacterial geomeans observed this season, for all sampling sites.

Site 20: Junkins Avenue

South Mill Pond is also located on the west side of the Piscataqua River, just south of downtown Portsmouth. The pond is bisected by Junkins Avenue, which allows circulation to the upper portion of the pond through two culverts under the road. This pond has manual floodgates and a spillway, with the floodgates opened intermittently usually during weekdays. Site 20 is located next to the South Playground across the upper pond from Portsmouth Middle School.

Average water temperatures at Site 20 were about midrange for all the sites in the GBCW network, 16.8° C at low tide and 18.2° C at high tide. The dissolved oxygen percent saturation was 76.5 percent at low tide and 90.1 percent at high tide. Salinity was 28.5 ppt at low tide and 28.7 ppt at high tide. Transparency at high tide was steady at 31 cm but was limited by water depth; the bottom was visible at a depth of 31 cm as well. The pH at this site was 7.5 at low tide and 7.6 at high tide. The fecal coliform geomeans increased slightly to 69 counts at low tide and 39 counts at high tide. Individual readings varied considerably.

Site 21: Pleasant Street

Site 21 sampling is done from the bridge over the outflow of the pond on Pleasant Ave., near Route 1-B. Average temperatures at Site 21 were also about midrange with 15.1° C at low tide and 16.0° C at high tide. The dissolved oxygen percent saturation was 83.2 percent at low tide and 98.3 percent at high tide, higher than at Junkins and above the Class B standard. The salinity at Site 21 was high due to its close proximity to the ocean, 28.5 ppt at low tide and 28.7 ppt at high tide. Transparency was 161 cm at high tide with a bottom visible depth of 161 cm at high tide as well. Low and high tide pH readings were 7.7 and 7.9, respectively. The fecal coliform geomeans at low tide were 35 counts and 8 counts at high tide, a small increase over the 2000 season.

Site 22: Little Harbor School

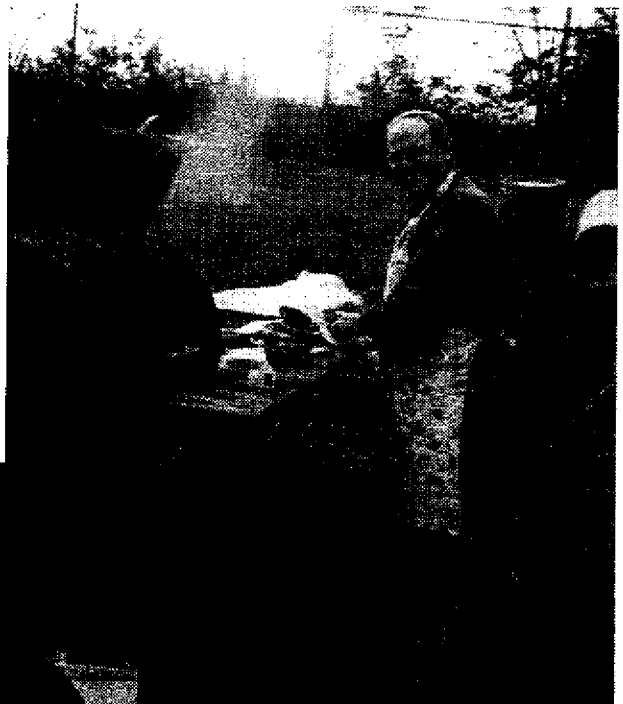
Site 22 is GBCW's newest site, starting in the Fall of 1998. Sampling is done here only at high tide. Teachers and students of Little Harbor School perform the monitoring from a local dock. Little Harbor School is located on Little Harbor, south of the main harbor in Portsmouth. In 2001, the third year of monitoring, average temperature was 16.8° C (high tide only). Dissolved oxygen percent saturation at high tide for this site was 109.9 percent. The salinity was consistently high at 30.3 ppt. Transparency was 174 cm with the bottom visible at a depth of 174 cm. The high tide fecal coliform geomean was 3 counts.

New Castle

GBCW volunteers monitor one site in the town of New Castle. Staff members of the New Hampshire Coastal Program also sample once a month from a dock adjacent to the sample site, and the data are compiled as Quality Assurance Quality Control (QAQC) reference data.

Site 11: Coastal Marine Lab

Located at the U.S. Coast Guard Station and the UNH Coastal Marine Lab in New Castle, Site 11 is where the Piscataqua River meets the Atlantic Ocean. Ocean water temperatures at Site 11 are typically the coldest in the network, averaging 12.4° C at low tide and 13.4° C at high tide. The dissolved oxygen percent saturation was at 96.2 percent at low tide and 99.3 percent at high tide, considerably above the Class B standard of 75 percent. The salinity readings were a steady 30.0 ppt for both tides, often the highest and most stable salinity values in the network. The pH was 7.8 at low tide and 7.9 at high tide. These are our clearest and deepest waters, with an average transparency of 350 cm at high tide and a depth of 525 cm. Fecal coliform geomeans were 2 counts for both tides, with very little variability during the season, and little variability since sampling began in 1992.



Map of Great Bay Estuarine System and Site Locations

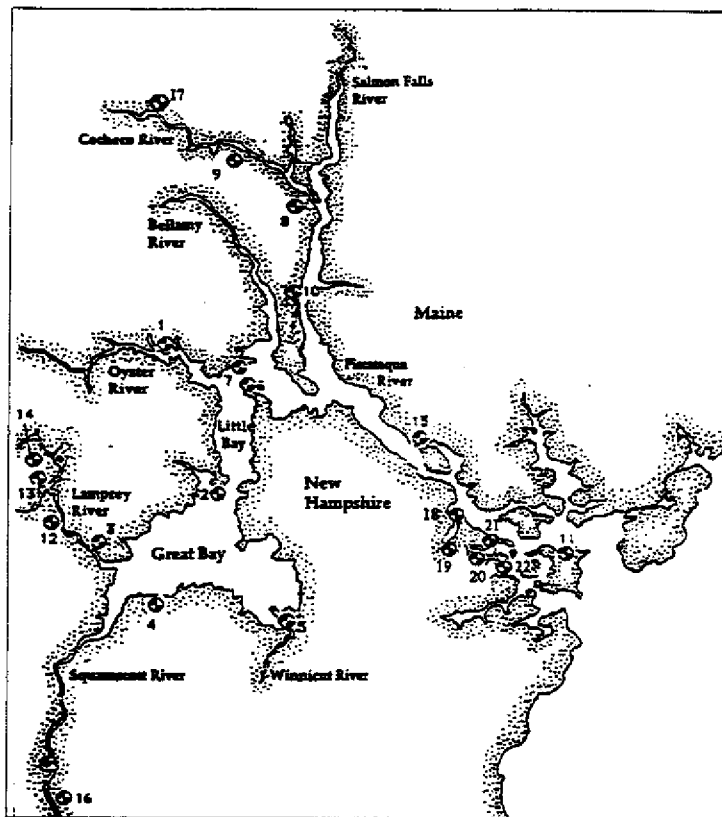
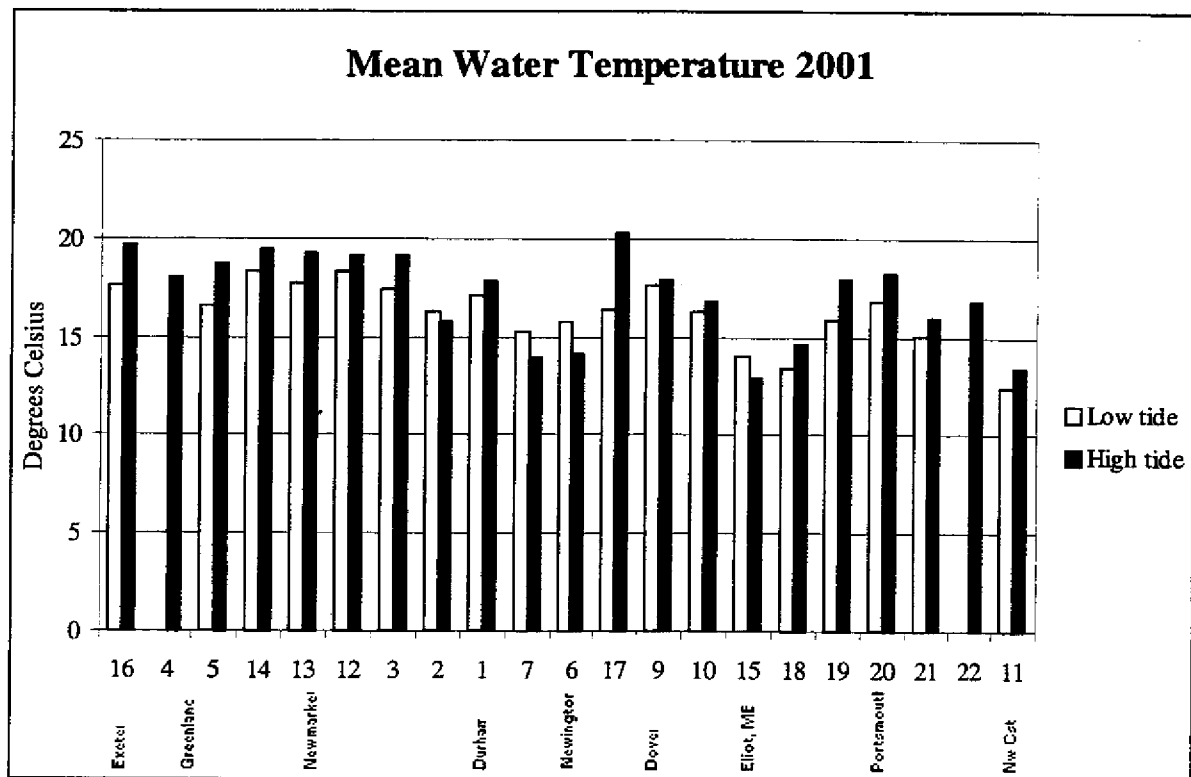
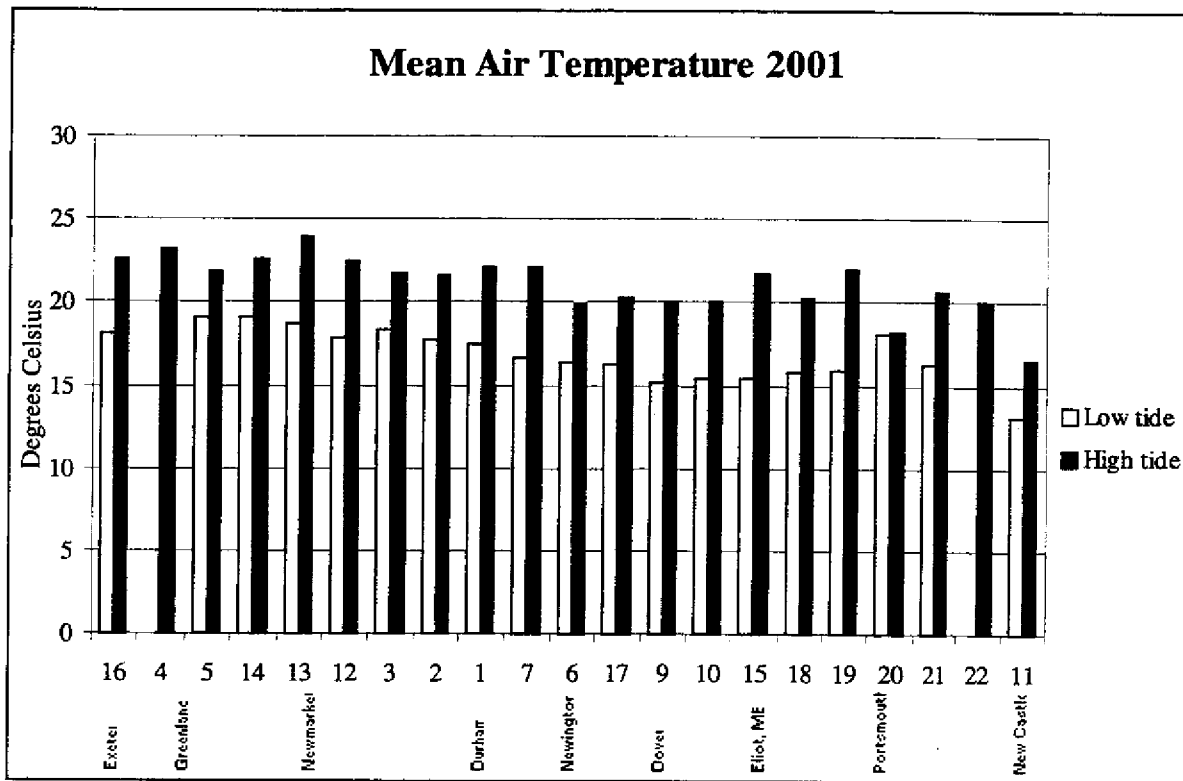
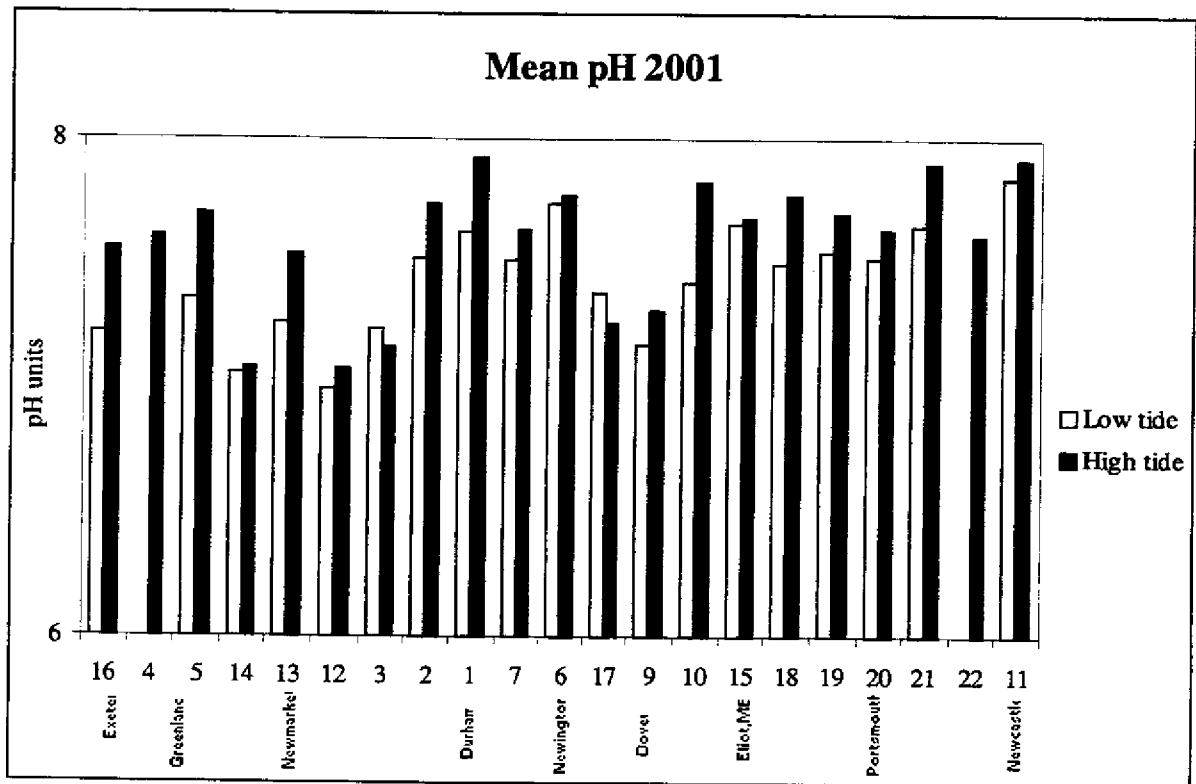
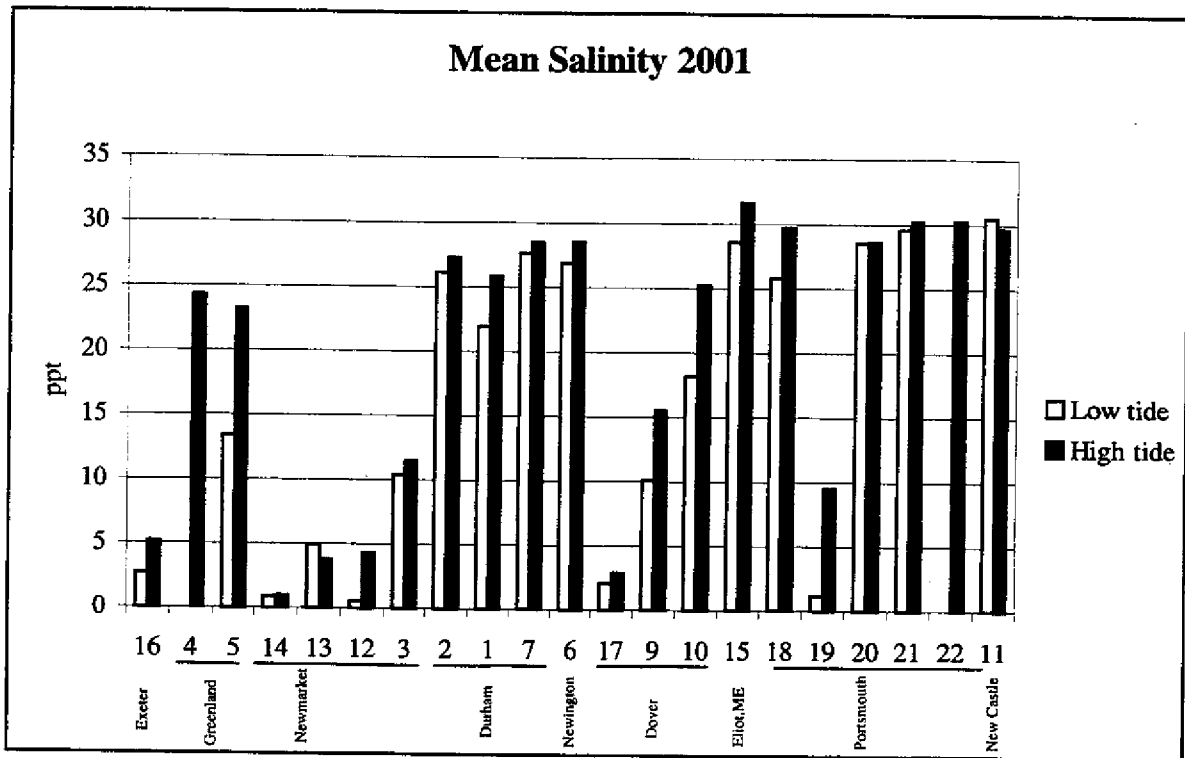


Table of Great Bay Coast Watch Sites: Locations, Towns and Year Started

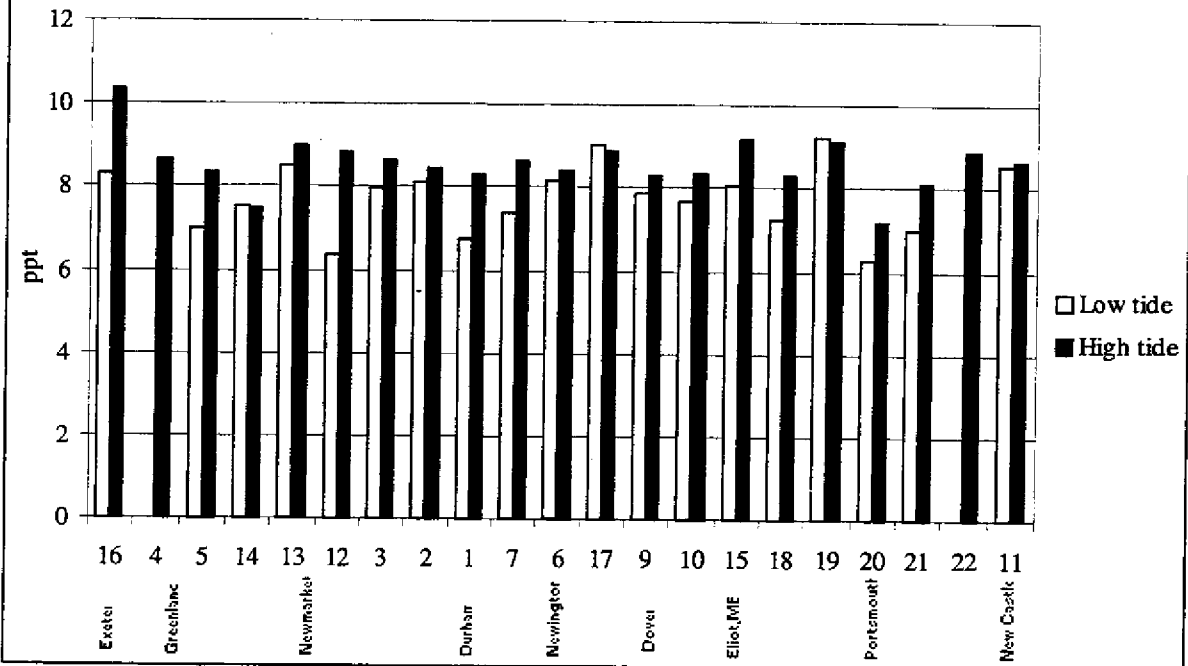
Site Name	Site #	Location	Town	Year Started	Comments
Peninsula	1	Oyster River	Durham	1990	
JEL	2	Great Bay	Durham	1990	
Lamprey River	3	Lamprey River	Newmarket	1990	
Depot Road	4	Great Bay	Greenland/ Stratham	1990	High tide only as of 1993
PCC	5	Winnicut River	Greenland/ Stratham	1990	
Fox Point	6	Little Bay	Newington	1990	
Cedar Point	7	Little Bay	Durham	1990	
Rakoskes'	8	Piscataqua River	Dover	1990	Inactive as of 1992
Neal's	9	Cocheco River	Dover	1990	
Clark's	10	Piscataqua River	Dover	1991	
CML	11	Piscataqua River	New Castle	1991	
STP	12	Lamprey River	Newmarket	1992	
Marina Falls Land.	13	Lamprey River	Newmarket	1992	
Fowler's	14	Lamprey River	Newmarket	1992	
Patten Yacht Yard	15	Piscataqua River	Eliot, Me	1993	
Exeter Docks	16	Squamscott River	Exeter	1994	
Dover Foot-Bridge	17	Cocheco River	Dover	1996	
Maplewood Ave.	18	North Mill Pond	Portsmouth	1997	
Bartlett Ave.	19	North Mill Pond	Portsmouth	1997	
Junkins Ave.	20	South Mill Pond	Portsmouth	1997	
Pleasant Ave.	21	South Mill Pond	Portsmouth	1997	
Little Harbor	22	Little Harbor	Portsmouth	1998	High tide only

2001 Mean Value Graphs

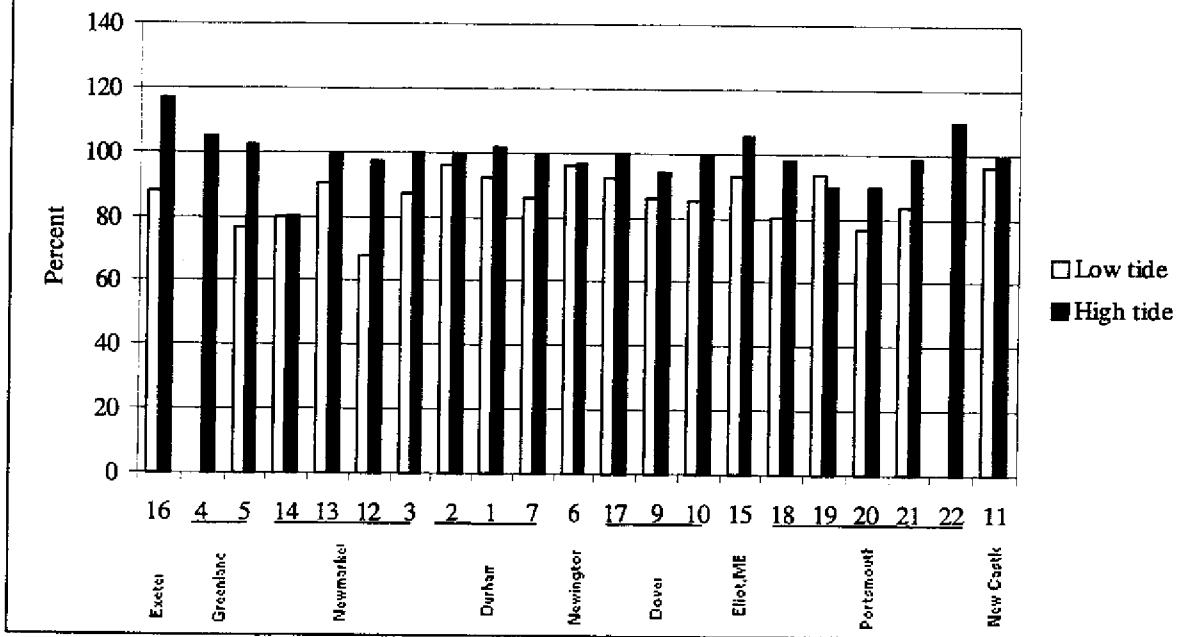




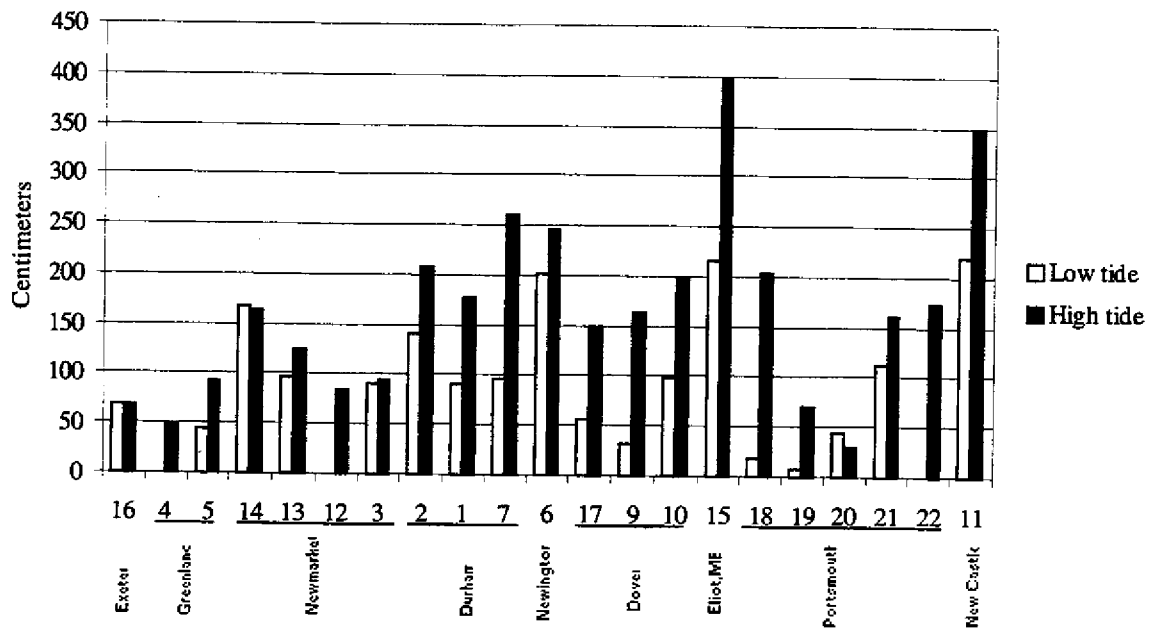
Mean Dissolved Oxygen 2001



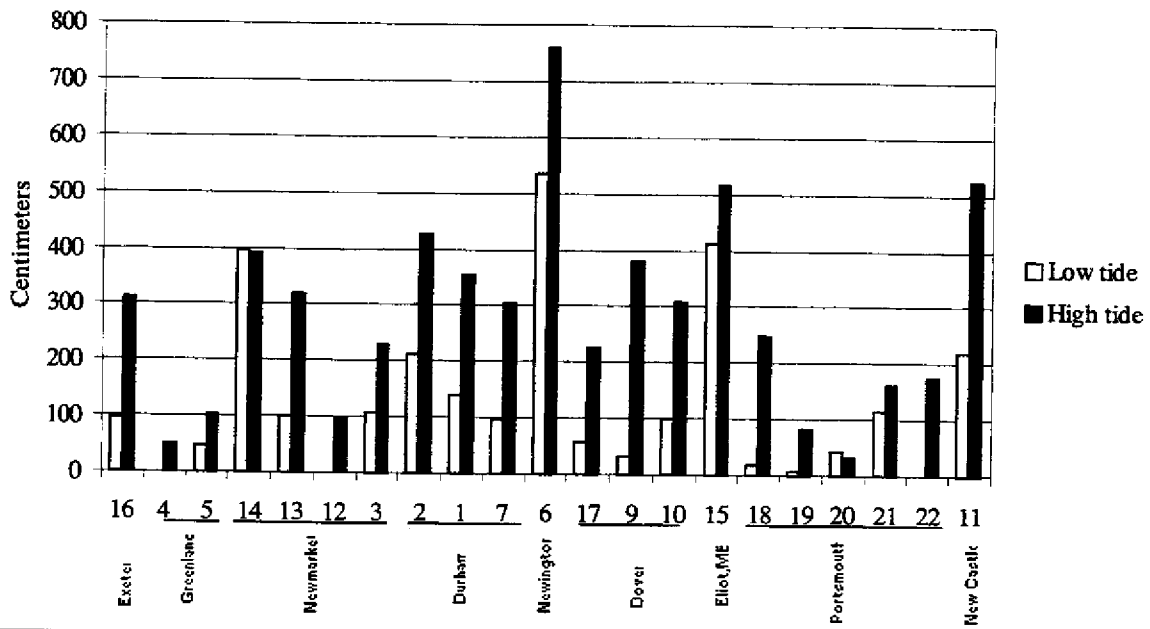
Mean Oxygen Saturation 2001



Mean Transparency 2001



Mean Depth 2001



Quality Assurance/Quality Control Analyses

The Accuracy and Precision of the Data Collected by Volunteers

GBCW employs several quality assurance and quality control (QAQC) activities to detect inconsistencies of measurements in the field, and ensure the quality of the monitors' measurements. Our QAQC plan is approved by the EPA and is on file in the EPA Region One office and in our office at UNH Kingman Farm. The three overall components of the QAQC plan include volunteer training, formal QAQC sessions, and split sampling in the field. The QAQC plan's purpose is to evaluate the quality of the data collected by the program so as to increase confidence in the data being furnished by the volunteer monitors.

The GBCW's work on QAQC focuses on these three areas. First, all new volunteers are trained and introduced to sampling techniques. Each year returning volunteers are retrained as well. Secondly, we have been testing volunteer monitors at QAQC sessions since 1992. Thirdly, we use QAQC teams to validate the volunteers' data with split field sampling. Each site was split sampled this season, ensuring that a majority of volunteers were visited "on-site" by members of our QAQC team. Volunteer training begins before the sampling season, and includes all volunteers, new and returning. A series of "dry run" meetings are held in February or March and are designed to demonstrate sampling techniques and provide hands on experience. One or two "wet runs," held in April, conducted in the field, are aimed at helping volunteers feel confident with procedures in the field.

Formal QAQC sessions are held twice a year. These sessions are designed so problems can be identified. Prior to each QAQC session, water thermometers, hydrometers, and pH meters are calibrated by members of our QAQC team who are assisted by the UNH Chemistry Lab Coordinator Amy Lindsay.

Volunteers test a common water sample for all of the parameters used in our monitoring program. The results are reviewed and analyzed by GBCW staff. Two factors are of primary interest when evaluating the quality of data collected by volunteer monitors. The first is accuracy, or how close on average the volunteers' measurements are to the true value of the characteristic being measured. A difference between the average monitor estimate and the actual value is computed and reported as the level of accuracy. The second factor is precision, or how close the volunteers' measurements are to one another's. Relative Standard Deviation (RSD) is used to show variance in replicate measurements of the same sample. Relative Percent Difference (RPD) is used to show variance in samples with only two replicates. The variation in the volunteers' measurements for a single sample is reported as the level of precision. The lower the result is, the more precise the measurements are.

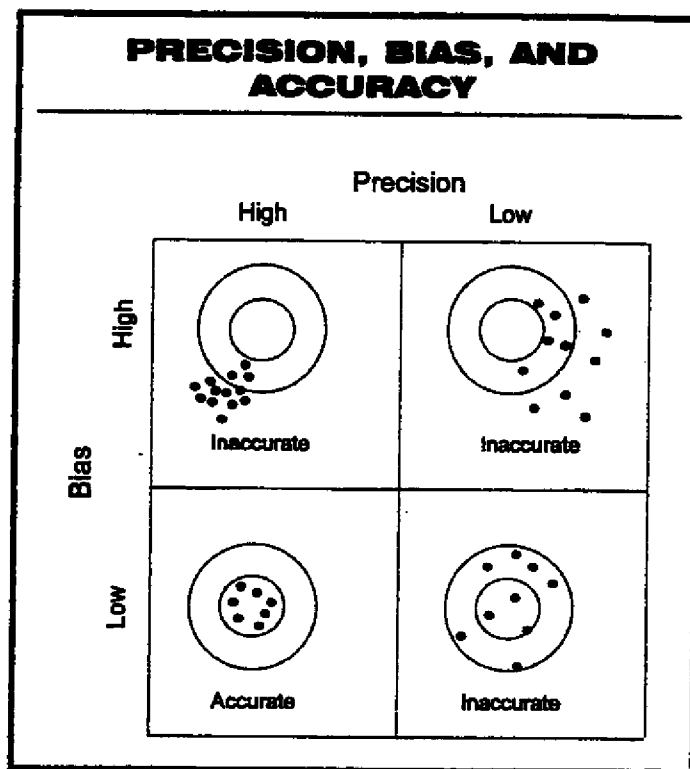


Figure provided by The Volunteer Monitor's Guide to Quality Assurance Project Plans, by the EPA, pg.18.

Both accuracy and precision of the GBCW volunteers have been evaluated. Beginning in 1992 we have had two QAQC sessions (time set aside to test all of the volunteers for accuracy and precision) a year, with the exception of 1993 and 1994 when we had three sessions and one session, respectively. In the first 1995 session, we found that there was a need to modify our procedures to control for external influences affecting the water samples. This prompted the procedural changes, mentioned below, which have been carried out since 1996. A summary of the results of the 2001 sessions can be found in the table below.

Table of GBCW Accuracy and Precision for QAQC sessions 2001

	Accuracy		Precision		
	Goal	Actual	Goal	Actual	RSD
Salinity Test 1 Low	0.82 ppt	0.905	1.0 ppt	0.615	61.827
Salinity Test 2 Med.	0.82 ppt	0.445	1.0 ppt	0.419	3.3291
Salinity Test 3 High	0.82 ppt	0.784	1.0 ppt	0.641	5.5774
PH	0.1 units	0.042	0.1 units	0.063	1.7905
Dissolved Oxygen	0.3 mg/L	0.844	0.9 mg/L	0.459	19.787
Water Temperature	0.5°C	0.198	1°C	0.755	11.429

RSD = Relative Standard Deviation, >20% is considered out of acceptable range.

Five years ago we made important adjustments to our QAQC procedures in order to control for external factors that may influence the water samples being tested. First, we designed a covered container to hold the water for dissolved oxygen sampling to try to control the fluctuation of dissolved oxygen levels. We also used our incubator for water temperature testing in order to keep a constant water temperature throughout the six-hour session.

The results from the QAQC session support confidence in GBCW results. Calculations for accuracy show that the values the volunteers obtained in their measurements are close to the known values. The mid range and high range salinity results are well within accuracy limits. The lowest salinity test shows a slightly higher result than our goal. This is due in part to the difficulty in measuring low salinity. For accuracy, the difference between 0 and the lowest measurable salinity can be great. A slight error in the hydrometer reading can end in a high number giving low accuracy results. Water temperature and pH accuracy results are indicative of a very high degree of accuracy. The DO accuracy result is far outside (± 0.84 mg/L) of our desired range (± 0.30 mg/L). This procedure involves the volunteer drawing a sample from a tub of water and processing a value from a DO Titration, while the QAQC officer obtains a reading from a YSI model DO meter. One of the difficulties we had was in keeping the meter within acceptable calibration limits provided by the manual. Another issue was that the standard oxygen value would vary with movement: the meter would have a lower reading when it was moved slowly in the sample, versus moving quickly in the same sample. Thirdly, in some cases there was up to a 15-minute lapse in time from when the water was measured with the meter and when the sample was obtained for titration. We will be working hard this next season to eliminate these complications. The meters we used were calibrated before each QAQC session.

In all cases, volunteers were within the preset GBCW goal for precision and within the majority of our goals for accuracy, set by the QAQC plan. This indicates that the volunteers are measuring the water quality parameters within acceptable levels of accuracy and precision, and that the data can be viewed with confidence. The issue of the accuracy and precision of the volunteers will continue to be addressed and tested by the GBCW QAQC sessions. The large RSD that is found in the low range salinity will be addressed in future QAQC sessions. Continued training and practice will bring this result in line with our QAQC plan.

The third component of the QAQC plan is split sampling in the field. These are designed to be "spot checks" of the volunteers in the field. The coordinator, or one of the trained staff, visits sites on sampling days, and performs all of the tests that the monitors do, at the same tide and location. In the past, we have provided results for the Average Standard Deviation (ASD) of Split sample results. This does not provide us with a complete evaluation of precision, so RPD has been included as well. This tells us how close our split results were to each other when comparing two replicates. RPD results may have increased due to the use of different sampling kits by QAQC Officers and the regular monitors. The RPD for split samples is provided in the table below.

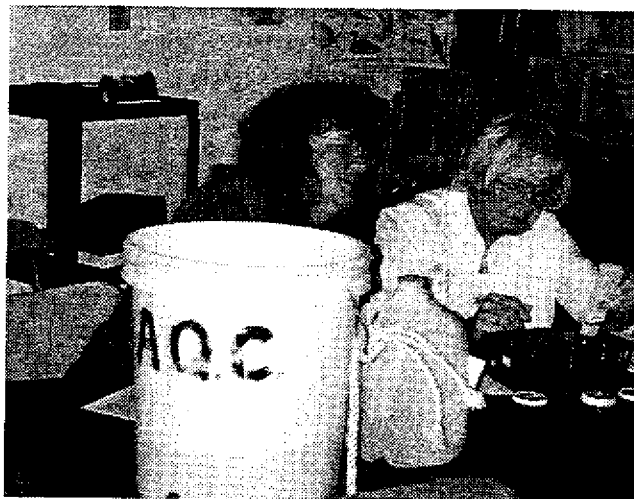
Table of 2001 Field QAQC (Split) Sample Precision Results

	Precision		
	Goal	ASD	RPD
Salinity	1.0 ppt	0.62	16.96
pH	0.1 units	0.11	2.05
Dissolved Oxygen	0.9 mg/L	0.37	6.28
Water Temperature	1°C	0.32	3.08

RPD = Relative Percent Difference, >20% is considered out of acceptable range.

The goal for precision was met in all cases, except pH, which was slightly higher than our preset goal. This data set shows that on the days when split samples were performed, the volunteers' readings differed, on average, from the QAQC officers' data by the actual amount shown above. One important reason for performing split samples is to reinforce the methods instructed and practiced at the training sessions and to make any necessary changes to improper methods used by the volunteers. Falling within the goal set by the QAQC plan for each parameter indicates that the volunteers are accurately measuring water quality parameters. These results are encouraging, and add to the overall credibility of the long-term data collected by the Watch

We are constantly striving to produce objective results and generating ways to make the QAQC sessions more effective in reaching the goal of measuring accuracy and precision. We had planned to review and update our present QAQC Plan this season, however a large influx of new projects kept us from that goal. A new SOP for Fecal Coliform Testing has been developed. Currently there is no QAQC plan developed for phytoplankton monitoring. GBCW collaborates with the Maine Phytoplankton Monitoring Program in spring and fall training sessions for our program. The water quality portion of this program is QAQC tested in the same way our regular program is tested, except for split samples, as this was not feasible this past sampling season. There are several complications with a QAQC test for phytoplankton. Organisms that have been preserved do not keep their shape and color well, so that using a fixed slide for QAQC purposes is not useful. Split samples would not show accuracy or precision. The program that we do follow is to have a second monitor re-count each slide as it is taken to check accurate counts. See the GBCW Phytoplankton Monitoring Program 2001 Report for more information on that project.



A QAQC test session for volunteers was added this year to include the volunteers who process samples for fecal coliform bacteria. QAQC is measured in multiple ways for the accuracy and precision of total fecal colony count results. Blank samples are filtered to ensure that cross contamination is not occurring between samples from the filtering apparatus. They are processed at the rate of two at the beginning, middle and end of each processing run, by each team. This totals up to 12 blanks per processing session. Our data shows that we have a clean record in this regard. We had zero positive results for our blank samples this season.

Duplicates on samples were processed at a rate of 10% of all aliquots, to show how repeatable our results are. A difference of greater than 20% would show that the data is questionable and could not be used. We can use some improvement in this area, but overall, we are doing well. Split samples are taken by QAQC officers in the field to show the repeatability of the samplers' results. When duplicate and split sample results show a difference of greater than 20% the data is labeled as questionable (marked in red on the data pages). For split samples the ASD is greater than our limit and can be improved for the next sampling season. The RPD is largely due to one result, which was accepted on the grounds of the QAQC split results equaling the original result. Without this replicate, the ASD equals 34.34 and the RPD equals 20.33. The full set of fecal data for 10/17/01 is labeled as questionable due to counts being obtained about 13 hours after the close of the twenty-four hour incubation period. This may decrease some counts as some colonies grew together, and caused others to over grow with fungus or mold such that some of the plates were unreadable. In this case, there were about 1½ inches of rainfall the night before sampling, as well as an overflow at the Portsmouth Wastewater Treatment Plant. Both of these conditions create a situation in which an abnormally high count would be expected. For this reason, these counts have been included in our data set. A few other counts have been discarded due to contamination by leaking bags in the incubation chamber.

Table of Fecal Coliform Precision Results

	Precision		
	Goal	ASD	RPD
Fecal Coliform Counts for Duplicate Samples	20CFU/100ML	14.42	15.80
Fecal Coliform Counts for Split Samples	20CFU/100ML	40.22	30.31

RPD = Relative Percent Difference, >20% is considered out of acceptable range.

F. References

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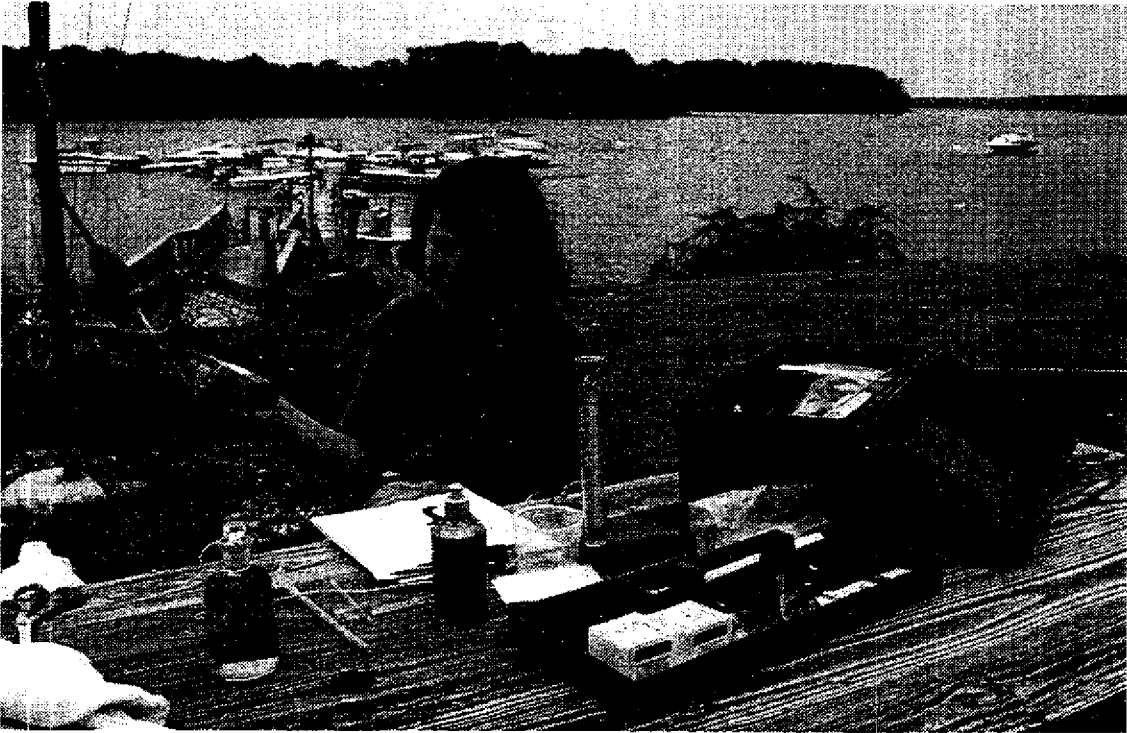
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G. Appendices

Appendix I - Site Data



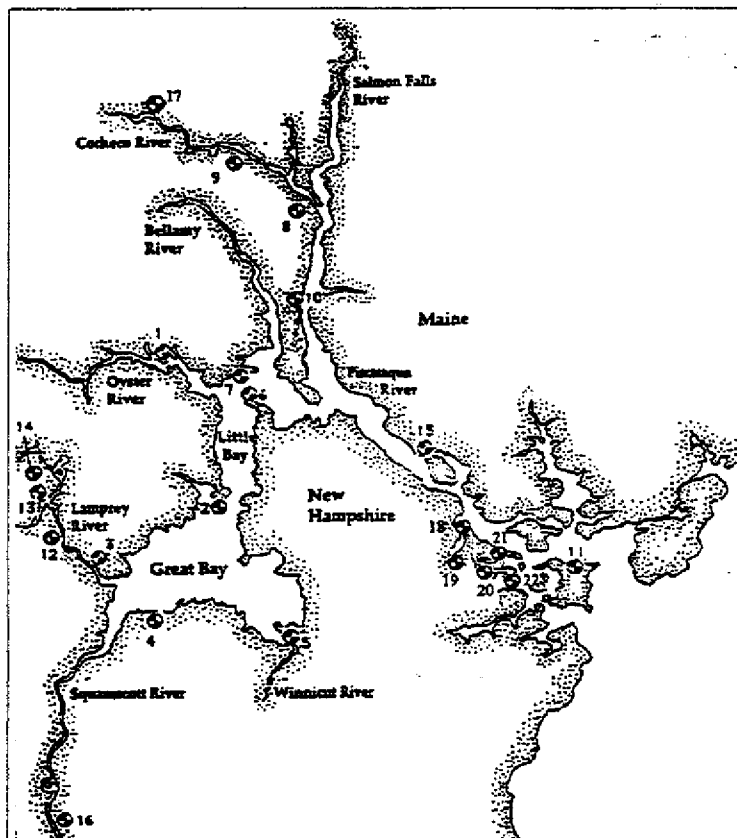


Table of Great Bay Coast Watch Sites: Locations, Towns and Year Started

Site Name	Site #	Location	Town	Year Started	Comments
Peninsula	1	Oyster River	Durham	1990	
JEL	2	Great Bay	Durham	1990	
Lamprey River	3	Lamprey River	Newmarket	1990	
Depot Road	4	Great Bay	Greenland/ Stratham	1990	High tide only as of 1993
PCC	5	Winnicut River	Greenland/ Stratham	1990	
Fox Point	6	Little Bay	Newington	1990	
Cedar Point	7	Little Bay	Durham	1990	
Rakoskes'	8	Piscataqua River	Dover	1990	Inactive as of 1992
Neal's	9	Cocheo River	Dover	1990	
Clark's	10	Piscataqua River	Dover	1991	
CML	11	Piscataqua River	New Castle	1991	
STP	12	Lamprey River	Newmarket	1992	
Marina Falls Land.	13	Lamprey River	Newmarket	1992	
Fowler's	14	Lamprey River	Newmarket	1992	
Patten Yacht Yard	15	Piscataqua River	Eliot, Me	1993	
Exeter Docks	16	Squamscott River	Exeter	1994	
Dover Foot-Bridge	17	Cocheo River	Dover	1996	
Maplewood Ave.	18	North Mill Pond	Portsmouth	1997	
Bartlett Ave.	19	North Mill Pond	Portsmouth	1997	
Junkins Ave.	20	South Mill Pond	Portsmouth	1997	
Pleasant Ave.	21	South Mill Pond	Portsmouth	1997	
Little Harbor	22	Little Harbor	Portsmouth	1998	High tide only

Site 1 - Peninsula

YEAR	SITE	DATE	SAMPLER-L	SAMPLER-H	WTMP-L	WTMP-H	DO-L	DO-H	SAL-L	SAL-H	SAT-L	SAT-H	pH-L	pH-H	FECAL-L	FECAL-H	LP-L	LP-H	DEPTH-L	DEPTH-H	ATEMP-L	ATEMP-H
					oC	oC	ppm	ppm	ppt	ppt	%	%			CFU/100ml	CFU/100ml	cm	cm			oC	oC
97		09/03/97	JF	JF	20.5	20.0	4.00	6.80	26.25	29.00	63.30	88.51	7.0	8.0	6	0	135.0	160.0	160.0	365.0	16.0	20.0
97		09/18/97	AL, BH	BB, LP	19.0	20.0	6.00	7.60	27.45	29.75	75.92	99.39	7.7	8.1	*	*	103.0	182.5	140.0	315.0	17.5	28.0
97		10/02/97	KW, LP, LP	BH, AL	12.0	15.0	7.60	8.25	27.15	30.45	83.36	98.38	8.0	8.1	11	0	105.0	197.5	150.0	345.0	8.0	19.0
97		10/17/97	LSP	BH, BH	11.5	13.5	7.00	8.48	27.75	30.30	76.23	97.97	7.9	8.2	30	0	120.0	267.5	148.0	405.0	9.0	15.5
97		11/03/97	BB, LP	BH	10.0	12.5	8.10	9.35	32.20	33.75	77.41	100.45	7.6	8.0	TNTC	*	50.0	107.5	175.0	386.0	8.0	14.5
98		05/12/98	BH, RG	CG, LP	11.0	13.0	8.35	8.80	4.00	11.30	77.82	89.45	7.1	7.5	146	68	85.0	97.0	110.0	365.0	9.0	13.0
98		06/10/98	SW, BH, AM, BM	LP, KW, LP	17.5	19.0	6.90	10.10	20.55	23.90	81.33	125.07	7.2	7.8	19	0	96.5	162.5	150.0	335.0	17.0	24.0
98		07/09/98	RB, SB	RE, AR	22.0	24.0	5.20	7.40	11.05	15.60	63.33	95.87	7.2	7.4	TNTC	26	65.0	138.0	165.0	350.0	22.0	27.0
98		08/10/98	DS, LP	KP, LP	23.5	24.0	5.50	7.00	27.30	28.20	75.51	97.48	7.1	7.6	TNTC	1	65.0	100.0	125.0	300.0	25.0	33.5
98		09/09/98	DS, CG, BB, LP	LM, LP	18.5	17.5	5.90	7.30	29.20	29.10	74.74	90.66	7.6	7.6	106	3	138.0	150.0	225.0	395.0	15.0	16.0
98		10/07/98	LP, AM, SW	BB, JM, MRS P	10.5	12.0	8.00	8.45	29.35	29.40	86.17	94.05	7.7	7.7	14	0	97.0	185.0	138.0	370.0	6.0	16.0
98		11/05/98	LP	WM, SW, DS, LP	6.0	8.5	8.50	9.20	11.10	27.25	73.35	93.45	7.5	7.4	1	7	105.0	185.0	120.0	390.0	9.0	14.0
99		04/29/99	LP	LP	10.0	11.0	8.60	9.80	19.90	23.85	86.17	102.97	7.4	7.7	66	0	110.0	135.0	145.0	375.0	9.0	19.0
99		05/17/99	LP, SW, LP	DS, LP	15.0	20.0	5.10	7.30	26.50	28.90	67.22	94.96	7.4	7.7	174	20	65.0	140.0	155.0	360.0	22.5	26.0
99		06/15/99	LP	LP, CG, BB	21.5	20.0	5.80	7.40	28.60	30.50	76.01	96.31	7.7	7.8	30	0	90.0	150.0	120.0	345.0	17.0	23.0
99		07/13/99	LP	LP	19.5	19.5	4.80	7.50	28.95	32.45	61.88	98.82	7.5	7.8	26	0	85.0	147.5	140.0	360.0	21.0	29.5
99		08/12/99	LP	LP, MW, BB	20.5	20.5	4.90	7.80	24.50	28.50	64.41	105.00	7.4	8.0	24	70	105.0	127.5	140.0	355.0	21.5	25.0
99		09/13/99	JW, TH	LP	22.0	22.0	8.00	8.00	25.20	26.85	86.65	90.38	7.8	7.8	10	0	125.0	200.0	*	305.0	6.0	12.0
99		10/12/99	SW, BM, CG, LP	LP, AB, PM, JW, BB, AT, TH	12.0	13.5	8.00	9.00	17.30	23.40	77.91	88.11	7.4	7.7	26	6	138.0	115.0	145.0	335.0	3.0	12.5
00		04/19/00	CG, KM, PM, JM, CH	CG, JW, LP	9.0	8.5	9.60	10.60	10.60	20.85	88.78	103.25	7.5	7.8	123	3	123.0	115.0	150.0	370.0	5.0	26.0
00		05/18/00	LP, JW, PM, KM	LP, JW, KP	15.0	15.0	6.50	8.60	15.00	20.40	70.47	96.29	7.3	7.5	20	2	80.0	125.0	135.0	345.0	15.5	22.0
00		06/19/00	JW	LP	20.5	21.5	5.30	7.20	17.00	21.90	64.86	92.35	7.3	7.7	77	10	67.5	105.0	140.0	335.0	20.0	26.0
00		07/17/00	JW, LP, AP	JW, LP	19.0	20.5	6.10	7.30	12.30	24.70	70.61	93.44	7.2	7.8	600	150	75.0	117.0	155.0	350.0	17.0	20.0
00		08/15/00	LP, JW	LP, JW	20.0	21.0	5.30	6.50	15.30	22.20	63.63	82.75	7.1	7.7	450	5	75.0	135.0	155.0	340.0	19.0	22.0
00		09/14/00	JQ, AC, BH, JM, EB, JW, LP, RS	LP, JW, RS	20.0	20.0	6.40	8.25	26.90	30.70	82.25	108.52	7.6	7.9	28	0	115.0	138.0	145.0	340.0	15.0	22.5
00		10/16/00	LP	JP, JW, LH, BH, KG	13.0	8.0	8.30	8.10	26.50	28.90	92.59	82.27	7.8	8.0	0	0	53.0	222.5	165.0	355.0	13.5	8.0
00		11/13/00	JW, BB	LP, LH, ON, JG, BH	11.0	11.0	8.90	8.90	23.60	23.60	93.36	93.36	7.4	7.4	0	0	190.0	190.0	190.0	215.0	7.0	14.0
01		04/24/01	JW	JW	14.0	16.0	9.10	10.00	6.80	12.70	92.12	169.22	7.5	7.8	16	2	112.5	130.0	145.0	360.0	17.0	29.0
01		05/23/01	BH, JG, SH, LP	JW, PM, LH	15.0	18.0	6.30	8.70	19.80	22.70	117.11	104.91	7.3	7.7	34	1	72.5	142.5	135.0	350.0	17.0	19.0
01		06/21/01	JW, LP	JW, LP	22.5	21.5	5.10	7.10	13.20	20.80	91.80	90.49	7.2	7.7	0	130	42.5	82.5	120.0	335.0	18.5	19.0
01		07/23/01	LP, JW	LP, JW	24.0	24.0	6.30	8.10	25.00	29.00	120.22	113.33	7.4	7.9	0	0	80.0	140.0	115.0	360.0	26.0	33.5
01		08/20/01	LP	LP	22.5	21.0	5.50	7.50	27.80	30.20	74.39	100.18	7.3	7.7	80	2	80.0	145.0	145.0	375.0	21.5	22.0
01		09/18/01	AC, JM, JZ, DH, HV, LP	JW, LH, EL	17.0	19.0	6.00	8.20	29.00	30.80	73.76	105.94	7.6	8.0	31	0	98.0	217.5	135.0	285.0	19.0	26.5
01		10/17/01	SH, JG, BH, HV, LP	LP, DH, JZ	13.5	13.0	7.20	8.10	23.95	30.80	79.86	92.93	8.2	8.8	310	7	95.0	200.0	165.0	410.0	14.0	14.0
01		11/01/01	JW	SH, JC, BH, DH, LH, LP	8.0	10.0	8.50	8.90	29.80	30.10	86.86	95.31	8.5	7.8	0	0	145.0	355.5	145.0	360.0	7.0	14.3

Site 2 - JEL

YEAR	SITE DATE	SAMPLER-L	SAMPLER-H	WTMPH-L	WTMPH-H	DO-L	DO-H	SAL-L	SAL-H	SAT-L	SAT-H	pH-L	pH-H	FECAL-L	FECAL-H	LP-L	LP-H	DEPTH-L	DEPTH-H	ATEMP-L	ATEMP-H
90	2	04/08/90		5.0	5.2	10.8	10.7	13.2	18.3	92.11	94.28	7.5	6.8			75.0	90.0			5.0	9.0
90	2	04/23/90		8.5	11.0	9.5	8.1	18.4	21.7	91.10	83.53	7.4	7.8	*	*	90.0	105.0	*	*	9.0	11.5
90	2	05/09/90		13.0	12.0	9.0	9.0	21.6	23.0	97.34	96.12	7.2	7.2	*	*	105.0	110.0	*	*	11.0	23.0
90	2	05/23/90		10.1	12.0	8.5	9.2	18.8	19.0	84.59	95.83	7.5	7.5	*	*	95.0	95.0	*	*	4.4	16.0
90	2	06/08/90		17.5	17.0	8.5	8.0	21.8	23.8	100.94	95.22	7.3	7.6	*	*	95.0	120.0	*	*	23.0	22.0
90	2	06/22/90		18.5	18.0	7.2	7.6	26.1	28.0	89.48	94.66	7.6	7.6	*	*	105.0	140.0	*	*	19.0	28.0
90	2	07/06/90		20.5	21.0	7.9	7.3	26.0	27.4	101.91	95.86	7.9	7.9	*	*	140.0	135.0	*	*	22.0	26.0
90	2	08/06/90		24.0	20.0	6.6	7.3	29.5	30.4	92.62	95.85	6.9	6.9	*	*	100.0	150.0	*	*	24.0	26.0
90	2	08/19/90		20.0	22.0	6.2	7.1	28.2	30.2	86.34	97.43	7.4	7.1	*	*	90.0	150.0	*	*	23.0	23.0
90	2	09/04/90		20.0	22.0	7.2	8.0	27.2	30.4	92.69	108.95	7.8	7.8	*	*	100.0	110.0	*	*	14.0	19.0
90	2	09/18/90		14.0	16.0	6.5	7.7	25.5	25.5	82.83	101.81	7.7	7.1	*	*	100.0	165.0	*	*	13.0	22.0
90	2	10/04/90		13.0	15.0	7.7	7.7	29.4	31.6	87.53	92.51	7.9	7.6	*	*	130.0	175.0	*	*	6.0	13.0
90	2	10/18/90		14.0	15.0	7.4	7.3	23.0	24.8	82.46	83.98	7.7	7.5	*	*	180.0	180.0	*	*	10.0	15.0
90	2	11/02/90		10.0	10.0	8.8	8.8	*	22.5	89.65	89.65	7.6	7.5	*	*	135.0	130.0	*	*	15.0	23.0
91	2	04/13/91	WP JH SJ	8.0	8.5	10.3	10.8	20.5	22.4	98.95	106.25	8.3	8.1	*	*	60.0	125.0	*	*	2.0	19.0
91	2	04/23/91	WP	7.5	*	9.3	*	15.8	*	85.87	*	*	*	*	*	35.0	*	*	*	10.0	10.0
91	2	04/27/91	WP JH SJ	11.0	12.0	9.4	10.3	14.8	17.5	93.35	106.31	7.5	7.5	*	*	70.0	120.0	*	*	19.0	25.0
91	2	05/13/91	HJ AR BP	15.0	14.5	7.8	7.6	17.0	21.3	85.57	84.67	7.3	7.6	*	*	65.0	86.0	*	*	19.0	25.0
91	2	05/28/91	JH SJ DJ	18.0	18.0	6.1	7.8	24.0	25.4	74.62	95.12	7.7	7.6	*	*	105.0	150.0	*	*	16.0	30.0
91	2	06/12/91	JH WP	19.0	19.0	7.2	7.9	26.8	29.1	90.74	100.98	7.8	7.4	*	*	100.0	145.0	*	*	18.0	26.0
91	2	06/23/91	JT	20.5	19.5	7.7	7.8	28.9	29.3	100.57	100.77	7.9	7.9	*	*	83.0	125.0	*	*	16.5	29.0
91	2	07/11/91	JT WP	19.5	18.5	6.4	7.4	29.7	31.5	82.37	95.63	7.8	7.8	*	*	121.0	150.0	*	*	18.5	26.0
91	2	07/26/91	JH SJ WP	22.0	22.0	6.8	8.1	31.1	31.8	93.00	111.26	7.8	7.4	*	*	110.0	185.0	*	*	22.0	24.0
91	2	08/09/91	SJ WP	22.0	20.0	7.2	7.4	31.8	31.2	98.90	97.65	7.9	7.8	*	*	130.0	190.0	*	*	19.0	26.0
91	2	08/25/91	JT JH	20.0	21.0	6.1	6.9	13.5	16.6	72.49	85.05	6.8	7.4	*	*	110.0	90.0	*	*	17.0	23.0
91	2	09/08/91	BP	18.0	18.0	7.1	7.1	25.1	26.9	86.87	87.21	7.7	7.7	*	*	110.0	140.0	*	*	18.0	24.0
91	2	09/23/91	BP SJ	15.0	16.0	7.5	7.5	27.2	23.1	87.59	87.13	7.5	7.6	*	*	180.0	230.0	*	*	12.0	19.0
91	2	10/06/91	BP SJ	13.0	16.0	7.3	8.0	20.3	21.5	78.32	92.04	7.1	6.5	*	*	145.0	190.0	*	*	5.0	12.0
91	2	10/23/91	SJ BP BG	10.0	12.0	8.9	8.6	20.8	22.9	89.19	91.79	7.8	7.6	*	*	175.0	205.0	*	*	5.0	9.0
91	2	11/06/91	BP BP	8.0	9.0	9.0	9.0	23.1	26.8	87.94	92.20	7.5	7.6	*	*	80.0	90.0	*	*	3.0	8.0
92	2	04/16/92	MS BP	7.0	7.0	11.4	11.4	20.8	23.5	107.18	109.10	8.0	8.1	*	*	90.0	135.0	*	*	13.0	17.0
92	2	05/01/92	MS BP	12.0	11.0	10.7	10.3	17.8	20.8	110.12	106.14	8.0	7.9	*	*	100.0	150.0	*	*	12.0	14.0
92	2	05/15/92	MS BP	13.5	14.0	8.8	9.7	21.4	24.7	96.07	108.68	7.8	7.8	*	*	100.0	140.0	*	*	13.5	16.0
92	2	05/31/92	BP	16.0	15.5	8.1	8.7	26.3	27.4	95.39	102.76	7.8	7.7	*	*	80.0	120.0	*	*	19.0	21.0
92	2	06/15/92	BP	19.5	20.5	7.1	7.6	22.2	23.4	87.86	96.53	7.7	7.8	*	*	105.0	152.0	*	*	22.0	26.0
92	2	06/30/92	MS BP	20.0	20.0	8.1	7.9	28.0	29.5	104.15	103.15	7.8	7.7	*	*	125.0	200.0	*	*	23.0	28.0
92	2	07/13/92	MS	20.4	20.5	7.7	7.5	29.3	31.5	100.42	100.06	7.8	7.8	3	1	95.0	150.0	*	*	18.0	27.0
92	2	07/29/92	MS BP	20.4	20.0	6.6	7.5	28.0	30.2	85.39	98.35	7.6	7.9	1	3	150.0	210.0	*	*	16.0	19.0
92	2	08/13/92	BP	20.0	19.0	7.0	8.0	32.5	30.2	93.12	102.32	7.8	7.7	29	8	180.0	190.0	*	*	22.0	22.0
92	2	08/27/92	MS BP	21.4	19.9	7.1	7.1	27.7	29.1	93.40	91.61	7.6	7.9	8	2	200.0	265.0	*	*	18.0	22.0
92	2	09/11/92	MS BP	20.5	19.0	7.0	7.6	29.1	30.2	92.02	97.82	7.5	7.8	4	1	150.0	195.0	*	*	1.0	15.0
92	2	09/25/92	BP	14.0	16.0	8.4	8.6	30.4	31.1	98.12	105.06	7.8	7.8	5	10	260.0	380.0	*	*	17.0	17.0
92	2	10/25/92	MS BP	15.5	16.0	8.7	9.0	31.1	30.2	105.22	108.70	7.9	7.9	30	30	195.0	200.0	*	*	8.0	9.0
92	2	11/09/92	MS BP	11.5	11.5	9.1	8.9	28.5	29.8	99.61	98.26	8.0	7.6	10	10	65.0	75.0	*	*	-2.0	3.5
92	2	11/09/92	MS BP	6.0	9.0	10.3	9.8	25.6	27.7	97.62	101.00	7.9	7.9	10	10	230.0	370.0	*	*	18.0	20.0
93	2	04/21/93	MS BP	10.0	11.5	10.6	11.2	7.3	10.9	98.40	109.87	7.1	7.1	*	*	55.0	115.0	*	*	12.0	18.0
93	2	05/06/93	BP NP MS	14.5	13.5	11.7	11.2	17.0	20.2	127.01	121.37	7.2	7.8	*	*	85.0	90.0	*	*	36.0	25.0
93	2	05/20/93	BP MS	13.5	13.5	7.5	8.0	23.3	23.3	82.85	88.37	6.7	7.5	0	0	90.0	110.0	*	*	12.0	18.0
93	2	06/03/93	BP NP MS	13.5	12.5	7.8	8.3	24.9	27.5	87.04	92.21	7.4	7.5	10	10	55.0	115.0	*	*	13.0	25.0

Site 2 - JEL

YEAR	DATE	SAMPLER-L	SAMPLER-H	WTEMP-L	WTEMP-H	DO-L	DO-H	SAL-L	SAL-H	SAT-L	SAT-H	pH-L	pH-H	FECAL-L	FECAL-H	LP-L	LP-H	DEPTH-L	DEPTH-H	ATEMP-L	ATEMP-H
				°C	°C	ppm	ppm	ppt	ppt	%	%			CFU/100ml	CFU/100ml	cm	cm	cm	cm	°C	°C
96	2	09/30/96	JP GV	15	15	6.69	7.7	28.5	30.7	78.78	91.97	7.6	7.7	0	21	165.0	238.0	225.0	430.0	11	18
96	2	10/19/96	LP OV	10	12	8.6	8	27.7	29.3	90.63	88.99	7.9	7.8	9	13	70.0	190.0	225.0	340.0	5	10
96	2	10/29/96	GP LP	10	10.5	8.4	8.5	9.5	15.5	78.99	83.81	7.1	7.5	8	10.5	50.0	75.0	250.0	460.0	8.0	10.5
96	2	11/06/96	LP AR	6	9	9.6	2.7	13.1	18.3	83.88	26.18	7.6	7.6	7	9	115.0	108.0	263.0	0	7.0	9.0
97	2	04/23/97	MB, EB, CB, RB	8	9	11.5	11.4	6	9.4	101.05	104.67	7.4	7.4	7	5	103.0	108.0	263.0	435.0	11.0	15.0
97	2	05/22/97	CB, EB	10	10	10.5	11.6	14.8	18.6	101.93	115.29	7.4	7.5	6	6	52.5	107.5	210.0	340.0	12.0	11.0
97	2	06/05/97	MB, EB, CB, RB	14.0	14.0	8.9	9.3	24.5	26.7	100.08	106.04	7.8	7.8	3	3	80.0	132.0	190.0	440.0	11.0	22.0
97	2	06/23/97	MB, EB, AR	21.0	19.0	8.2	8.7	27.1	28.9	107.48	111.07	7.7	7.9	*	*	107.5	185.0	165.0	430.0	14.0	15.0
97	2	07/07/97	MB, EB, AR	21.0	19.0	7.9	8.7	29.1	30.2	104.81	111.97	7.8	7.8	0	1	85.0	50.0	190.0	375.0	24.0	27.0
97	2	07/21/97	MB, EB, CB	20.0	19.0	7.9	9.3	26.6	26.9	101.31	117.28	7.8	7.7	0	1	95.0	155.0	200.0	395.0	25.0	28.0
97	2	08/04/97	EB, MB, CB, RB	21.0	20.0	8.1	8.7	29.6	30.2	107.80	114.09	7.8	7.8	0	6	95.0	50.0	195.0	420.0	19.0	19.0
97	2	08/19/97	EB, MB, CB	20.5	19.0	7.4	7.6	30.0	29.8	97.81	97.57	7.8	7.8	0	2	150.0	183.0	165.0	405.0	19.0	21.0
97	2	09/03/97	EB, MB, CB	20.0	19.0	7.5	7.8	29.2	29.5	97.75	99.95	7.6	7.8	2	1	33.0	253.0	200.0	405.0	18.0	23.0
97	2	09/18/97	CB, MB, EB	19.0	18.0	8.1	7.4	28.8	29.5	103.35	93.04	7.9	7.8	1	0	205.0	298.0	205.0	410.0	17.6	22.0
97	2	10/02/97	MB, EB, CB	12.0	13.0	8.5	8.6	30.4	30.6	95.24	98.53	7.8	7.8	1	2	185.0	225.0	205.0	470.0	20.0	28.0
97	2	10/17/97	EB, CB, MB	11.5	13.0	9.3	8.7	30.2	31.4	102.95	99.60	7.8	7.7	6	1	210.0	297.5	210.0	450.0	8.0	15.0
97	2	11/03/97	EB, MR, CB	10.0	10.0	9.1	8.9	27.1	27.1	95.49	99.39	7.6	7.8	1	1	105.0	192.5	240.0	450.0	7.0	15.0
98	2	05/12/98	EB, MB, CB	11.0	12.0	9.5	9.0	9.7	14.3	91.51	91.08	7.3	7.4	4100	14	60.0	95.0	260.0	445.0	12.0	15.0
98	2	07/09/98	MB, EB, JJ	16.0	16.0	8.9	9.1	23.5	25.6	103.65	107.36	7.8	7.8	2	0	153.0	188.0	210.0	405.0	18.5	23.0
98	2	08/10/98	MB, CB	20.0	20.0	6.3	6.8	10.1	19.6	73.46	83.68	7.1	7.3	0	0	165.0	138.0	230.0	420.0	18.0	25.0
98	2	09/09/98	PS, CB	22.5	21.0	6.7	8.8	29.5	30.4	91.56	117.69	7.6	7.5	3	0	120.0	140.0	200.0	420.0	26.0	29.0
98	2	10/07/98	PS, BT	18.0	16.0	6.6	7.4	29.9	30.7	83.19	90.14	7.7	7.6	4	2	190.0	207.5	245.0	485.0	19.0	16.0
98	2	11/05/98	PS	11.0	11.0	8.1	8.8	29.4	31.0	88.22	96.87	7.8	7.5	1	0	190.0	242.5	220.0	465.0	2.0	14.0
99	2	04/29/99	CB, EB, MB	6.5	8.0	8.6	8.8	26.3	29.2	82.86	85.53	6.9	7.4	2	0	130.0	207.5	200.0	485.0	5.0	10.0
99	2	05/17/99	EB, MB, CB	9.5	9.5	9.8	9.8	24.8	26.1	100.16	101.05	7.9	7.8	4	1	30.0	205.0	220.0	425.0	10.0	16.0
99	2	06/15/99	EB, MB, CB	14.5	14.0	8.0	9.3	25.9	27.2	91.72	106.41	7.6	7.7	4	1	120.0	180.0	190.0	430.0	16.0	19.0
99	2	07/13/99	CB, RS	20.0	20.0	6.7	7.4	28.9	29.6	87.16	94.86	7.4	7.4	2	0	112.5	140.0	215.0	410.0	23.0	22.0
99	2	08/12/99	CB, CP	19.0	18.0	7.1	7.3	31.2	30.8	91.96	92.53	7.4	7.4	0	0	135.0	205.0	190.0	430.0	15.0	20.0
99	2	09/13/99	CB, EB	19.0	19.0	7.5	7.8	24.3	31.2	93.10	101.02	7.7	7.9	0	0	152.5	257.5	210.0	435.0	21.0	22.0
99	2	10/12/99	CB, MB, EB	21.0	19.5	7.1	7.7	30.2	30.3	94.84	100.06	7.8	7.1	10	6	180.0	225.0	215.0	435.0	22.0	22.0
99	2	11/09/99	MB, EB, CB	12.0	12.0	9.0	8.7	26.5	28.1	98.27	96.01	7.6	7.6	4	5	210.0	310.0	210.0	430.0	9.0	15.0
00	2	04/19/00	EB, MB, CB	6.0	7.5	9.6	9.7	23.1	25.3	89.47	95.01	7.6	7.4	8	8	180.0	210.0	225.0	440.0	3.0	10.0
00	2	05/18/00	EB, MB, RB	8.50	8.00	10.30	10.60	19.60	22.10	99.53	102.90	8.60	8.30	3.00	1.00	92.50	125.00	220.00	445.00	6.00	7.50
00	2	06/19/00	MB, EB, RB	14.00	11.00	8.30	8.70	19.75	21.20	90.66	89.88	7.60	7.50	3.00	3.00	95.00	75.00	220.00	430.00	16.00	21.00
00	2	07/17/00	JI, JI, D, D-P	20.00	18.00	6.50	6.50	23.30	25.00	81.74	79.48	7.20	7.10	0.00	1.00	120.00	170.00	230.00	505.00	19.00	22.00
00	2	08/15/00	DD-P, BD	20.00	19.00	6.90	7.10	29.50	28.85	84.87	90.62	7.80	7.80	13.00	18.00	90.00	122.50	240.00	425.00	16.50	19.00
00	2	09/14/00	EB, MB	20.00	20.00	6.90	6.60	29.90	27.20	88.14	84.97	7.60	7.60	0.00	2.00	125.00	142.50	230.00	430.00	19.00	21.50
00	2	10/16/00	EB, MB	19.00	19.00	8.60	8.60	29.50	30.20	110.20	110.69	7.70	7.90	0.00	0.00	75.00	275.00	220.00	420.00	16.00	23.00
00	2	11/13/00	EB, MB	12.00	11.00	8.60	8.50	28.90	28.90	95.41	92.30	7.60	7.70	4.00	2.00	175.00	237.00	210.00	440.00	7.00	5.00
01	2	04/24/01	EB, MB	9.00	10.00	8.70	8.90	23.50	26.10	87.21	92.81	7.50	7.80	12.00	31.00	200.00	205.00	230.00	470.00	6.00	10.00
01	2	05/23/01	EB, MB	12.0	12.0	9.8	9.9	11.0	15.2	97.28	100.76	7.1	7.8	0	1	155.0	172.5	225.0	440.0	19.0	31.0
01	2	06/24/01	EB, RB	14.5	14.0	8.0	8.0	25.6	26.6	91.54	91.16	7.5	7.8	0	3	95.0	150.0	205.0	410.0	15.5	18.0
01	2	07/23/01	EB, MB	22.0	20.0	7.1	7.2	21.8	23.9	91.86	90.87	7.4	7.5	6	5	125.0	170.0	190.0	395.0	20.0	18.5
01	2	08/20/01	EB, MB	22.0	20.0	7.7	7.9	28.2	28.9	103.47	102.77	7.6	7.8	13	2	120.0	175.0	205.0	420.0	28.0	30.0
01	2	09/18/01	MB, CB	17.0	20.0	6.9	7.8	30.3	31.2	92.22	102.92	7.6	7.8	2	2	145.0	205.0	200.0	430.0	22.0	24.0
01	2	10/17/01	MB, CB	13.0	13.0	7.9	8.6	31.6	31.9	98.73	107.69	7.7	7.7	2	7	195.0	280.0	270.0	460.0	17.0	25.0
01	2	11/01/01	MB, CB	9.0	10.0	9.4	9.5	29.9	30.0	98.33	101.67	7.6	7.8	6	1	210.0	385.0	210.0	415.0	12.0	8.0

SITE 3 - Lamprey River

YEAR	DATE	SAMPLER-L	SAMPLER-H	WTMP-L	WTMP-H	WTMP-H	DO-L	DO-H	BAL-L	BAL-H	SAT-L	SAT-H	pH-L	pH-H	FZCAL-L	FZCAL-H	LF-L	LF-H	DEPTH-L	DEPTH-H	ATMOSP-L	ATMOSP-H
				°C	°C	°C	mg/L	mg/L	mg/L	mg/L	%	%	µM	µM	CM/100ML	CM/100ML	cm	cm	cm	cm	°C	°C
91	02/09/95		DB MA	18.6	20.0	21.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
92	02/10/95		DB MA	20.0	21.0	21.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
93	02/11/95		DB MA	21.0	22.0	22.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
94	02/12/95		DB MA	22.0	23.0	23.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
95	03/01/95		DB MA	23.0	24.0	24.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
96	03/02/95		DB MA	24.0	25.0	25.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
97	03/03/95		DB MA	25.0	26.0	26.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
98	03/04/95		DB MA	26.0	27.0	27.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
99	03/05/95		DB MA	27.0	28.0	28.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
100	03/06/95		DB MA	28.0	29.0	29.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
101	03/07/95		DB MA	29.0	30.0	30.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
102	03/08/95		DB MA	30.0	31.0	31.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
103	03/09/95		DB MA	31.0	32.0	32.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
104	03/10/95		DB MA	32.0	33.0	33.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
105	03/11/95		DB MA	33.0	34.0	34.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
106	03/12/95		DB MA	34.0	35.0	35.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
107	03/13/95		DB MA	35.0	36.0	36.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
108	03/14/95		DB MA	36.0	37.0	37.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
109	03/15/95		DB MA	37.0	38.0	38.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
110	03/16/95		DB MA	38.0	39.0	39.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
111	03/17/95		DB MA	39.0	40.0	40.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
112	03/18/95		DB MA	40.0	41.0	41.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
113	03/19/95		DB MA	41.0	42.0	42.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
114	03/20/95		DB MA	42.0	43.0	43.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
115	03/21/95		DB MA	43.0	44.0	44.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
116	03/22/95		DB MA	44.0	45.0	45.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
117	03/23/95		DB MA	45.0	46.0	46.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
118	03/24/95		DB MA	46.0	47.0	47.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
119	03/25/95		DB MA	47.0	48.0	48.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0
120	03/26/95		DB MA	48.0	49.0	49.0	6.4	7.6	4.8	9.8	91.33	92.50	7.4	7.4	340	340	81.5	81.5	210.0	210.0	24.0	24.0

Site 5 - Portsmouth Country Club

YEAR	DATE	SAMPLER-L	WTEMP-H	WTEMP-L	DO-L	DO-H	SAL-L	SAL-H	SAT-L	SAT-H	pH-L	pH-H	FECAL-L	FECAL-H	LP-L	LP-H	DEPTH-L	DEPTH-H	ATEMP-L	ATEMP-H
			oC	oC	ppm	ppm	ppt	ppt	%	%			CFU/100ml	CFU/100ml	cm	cm			oC	oC
90	5	4/8/90	5.0	11.0	10.7	10.4	2.80	7.20	85.64	98.73	7.2	7.3			23.0	23.0			3.0	14.0
90	5	4/25/90	11.0	11.0	9.3	9.3	1.80	16.00	85.61	93.03	7.3	7.7			65.0	65.0			10.0	10.0
90	5	5/9/90	12.0	21.0	8.8	8.9	2.00	12.70	82.97	107.33	7.5	7.4			55.0	55.0			11.0	27.0
90	5	5/24/90	10.0	15.0	9.0	8.6	1.80	13.90	80.94	92.64	7.4	7.6			36.0	36.0			12.0	9.0
90	5	6/8/90	17.0	23.0	7.7	7.9	4.10	17.50	81.81	101.58	7.3	7.8			45.0	45.0			18.0	22.0
90	5	6/22/90	18.0	25.0	5.8	7.7	10.80	22.50	65.27	105.57	7.2	7.8			45.0	45.0			17.0	29.0
90	5	7/7/90	20.0	24.0	6.6	8.2	10.10	24.80	76.96	111.93	7.4	8.0			50.0	50.0			17.0	22.0
90	5	7/22/90	23.0	26.0	4.7	7.1	20.10	28.20	61.33	102.36	7.5	8.0			75.0	75.0			22.0	27.0
90	5	8/6/90	23.0	23.0	5.5	7.5	18.60	29.50	71.16	103.41	7.4	7.9			45.0	45.0			23.0	22.0
90	5	8/20/90	19.0	21.0	6.6	8.3	12.20	26.10	76.36	108.14	7.2	8.0			90.0	90.0			10.0	19.0
90	5	9/4/90	18.0	21.0	6.5	7.9	10.80	22.20	73.14	100.57	7.3	7.7			95.0	95.0			14.0	20.0
90	5	9/18/90	12.0	14.0	6.6	8.2	14.90	26.90	67.05	93.65	7.3	7.8			55.0	55.0			10.0	13.0
90	5	10/4/90	12.0	15.0	6.6	8.5	17.50	27.40	68.12	99.40	7.8	8.2			50.0	50.0			11.0	23.0
90	5	10/18/90	13.0	14.0	7.2	7.3	0.10	10.80	68.69	75.61	7.2	7.2			60.0	60.0			17.0	24.0
90	5	11/2/90	*	10.0	*	9.1	*	14.60	*	88.24	*	7.6	*	*	80.0	80.0	*	*	*	19.0
91	5	4/14/91	6.5	11.5	9.9	10.4	2.80	17.50	82.28	106.15	7.5	8.1			70.0	70.0			3.0	11.0
91	5	4/28/91	13.0	15.0	8.1	8.6	2.10	11.40	78.14	91.30	7.0	7.6			30.0	30.0			9.0	12.0
91	5	5/14/91	18.5	17.0	6.0	7.5	5.60	17.10	66.26	85.76	7.3	7.6			45.0	45.0			17.0	15.0
91	5	5/28/91	18.0	23.0	6.2	7.2	8.20	22.60	68.76	95.31	7.4	7.7			65.0	65.0			16.0	28.0
91	5	6/12/91	21.0	24.0	4.8	6.1	10.30	22.90	57.12	82.35	7.3	7.8			70.0	70.0			20.0	25.0
91	5	6/26/91	21.0	25.0	7.2	8.5	14.20	27.80	87.56	120.17	7.7	8.0			85.0	85.0			21.0	30.0
91	5	7/11/91	20.0	23.0	5.8	8.0	20.60	29.80	71.79	110.51	7.4	7.9			90.0	90.0			18.0	27.0
91	5	7/26/91	22.0	23.0	4.6	6.0	18.60	30.20	58.43	83.08	7.5	7.8			85.0	85.0			20.0	24.0
91	5	8/9/91	22.0	23.0	5.5	7.4	23.80	32.10	72.00	103.66	7.6	7.9			95.0	95.0			19.0	21.0
91	5	8/23/91	19.0	23.0	6.0	7.4	1.80	9.60	65.58	91.10	7.1	7.5			70.0	70.0			16.0	20.0
91	5	9/9/91	18.0	22.0	5.8	8.6	6.00	23.80	63.55	112.58	7.3	7.9			95.0	95.0			12.0	19.0
91	5	9/23/91	12.0	16.0	7.8	8.0	3.30	20.90	74.08	91.70	7.2	7.7			95.0	95.0			11.0	18.0
91	5	10/7/91	12.0	13.5	7.6	8.4	2.00	13.90	71.65	87.64	7.3	7.6			55.0	55.0			5.0	12.0
91	5	10/23/91	7.0	11.0	8.8	9.4	1.60	17.50	73.55	94.90	7.3	7.7			50.0	50.0			2.0	14.0
91	5	11/6/91	5.0	6.0	9.2	9.5	5.20	22.00	74.69	87.89	7.7	7.8			*	*			0.0	7.0
92	5	4/16/92	5.5	8.5	10.8	12.0	2.80	18.30	87.54	115.00	7.2	8.3			BSV	55.0			-2.0	2.0
92	5	5/2/92	12.5	14.5	8.6	9.8	2.10	15.30	82.03	105.31	7.4	8.1			BSV	90.0			11.0	13.0
92	5	5/16/92	13.5	15.5	7.3	8.5	6.70	18.70	73.05	95.17	7.4	7.8			BSV	65.0			8.0	14.0
92	5	6/1/92	14.0	13.5	6.4	7.5	12.60	17.60	66.98	80.00	7.4	7.6			BSV	35.0			9.0	9.0
92	5	6/14/92	21.0	27.0	4.6	6.9	3.70	13.90	52.83	93.42	7.1	7.7			BSV	55.0			20.0	30.0
92	5	6/30/92	22.0	26.0	5.1	8.6	16.00	25.60	63.84	122.13	7.2	7.9			BSV	80.0			20.0	29.0
92	5	7/14/92	21.0	20.0	5.5	6.7	11.60	27.20	65.92	86.26	7.2	7.7			BSV	95.0			20.0	17.0
92	5	7/28/92	20.0	22.0	5.9	7.5	14.00	26.80	70.31	99.94	7.3	7.7			BSV	100.0			22.0	24.0
92	5	8/13/92	19.0	20.0	6.8	8.7	14.40	27.20	79.65	112.01	7.4	7.8			BSV	100.0			12.0	19.0
92	5	8/27/92	22.5	24.0	4.5	6.2	16.00	26.00	56.85	85.22	7.2	7.6			BSV	125.0			20.0	26.5
92	5	9/11/92	20.0	21.0	5.1	7.1	12.70	27.40	60.33	93.23	7.2	7.7			BSV	BSV			18.0	22.0
92	5	9/26/92	12.0	14.0	7.4	8.7	17.50	29.50	76.38	101.03	7.5	7.9			BSV	BSV			11.0	15.0
92	5	10/11/92	13.0	14.0	6.2	7.7	10.50	28.50	62.73	88.84	7.1	7.5			BSV	BSV			13.0	17.0
92	5	10/25/92	9.0	9.0	8.1	8.8	9.30	26.00	74.33	89.67	7.2	7.6			BSV	BSV			7.0	8.0
92	5	11/9/92	1.0	3.0	10.9	10.9	2.20	19.10	78.15	91.80	7.5	7.7			BSV	80.0			-6.0	2.0
93	5	4/21/93	13.5	15.5	8.8	11.2	1.10	4.40	85.35	115.51	7.3	8.2			BSV	BSV			15.0	20.0
93	5	5/6/93	17.0	18.5	7.6	7.9	1.80	15.50	79.75	92.21	7.4	7.5			BSV	BSV			19.0	29.0
93	5	5/20/93	13.5	15.5	7.3	7.9	3.90	18.60	71.91	88.40	7.2	7.4			BSV	BSV			11.5	13.0
93	5	6/3/93	14.0	17.5	6.6	7.8	10.30	23.00	68.16	93.41	7.4	7.6			BSV	BSV			14.0	22.0
93	5	6/23/93	19.5	21.5	6.2	6.9	15.60	26.80	73.83	90.44	7.3	7.6			BSV	BSV			20.0	24.0
93	5	7/6/93	24.5	28.0	7.2	7.6	19.80	15.70	96.35	105.71	7.4	7.7			BSV	BSV			24.0	34.0

Site 5 - Portsmouth Country Club

YEAR	SITE	DATE	SAMPLER-L	WTEMP-H	WTEMP-L	DO-L	DO-H	SAL-L	SAL-H	SAT-L	SAT-H	pH-L	pH-H	FECAL-L	FECAL-H	LP-L	LP-H	DEPTH-L	DEPTH-H	ATEMP-L	ATEMP-H
				oC	oC	pphm	pphm	ppt	ppt	%	%			CFU/100ml	CFU/100ml	cm	cm			oC	oC
96	5	11/6/96	BB,DC,SM	6.5	6.5	10.7	9.7	0.20	6.70	87.6	82.5	7.3	7.2	21	12	BSV	47.5	45.0	95.0	7.5	8
97	5	4/23/97	BB,DC	10.5	14.5	9.2	10	0.60	3.60	83.1	100.5	7.8	7.5	8	6	45.0	72.5	45.0	125.0	12.0	14.0
97	5	5/6/97	BB,DC	11.0	11.0	9.2	9.3	0.30	13.50	84.0	91.6	7.6	7.8	22	15	45.0	70.0	45.0	130.0	11.0	10.0
97	5	5/22/97	BB,DC	12.5	14.0	9.0	8.4	0.33	13.20	85.0	89.3	7.5	7.7	*	*	45.0	27.5	45.0	115.0	11.0	14.0
97	5	6/5/97	BB,DC	15.0	16.5	7.0	8.2	8.25	20.25	73.0	94.6	7.4	7.8	*	*	45.0	50.0	45.0	125.0	13.0	14.0
97	5	6/23/97	BB,SM,DC	23.0	25.0	7.6	7.0	10.55	24.35	94.0	97.0	7.6	7.8	192	14	45.0	35.0	45.0	115.0	24.0	26.0
97	5	7/7/97	BB,DC,SM	24.0	27.0	8.1	8.3	14.55	27.15	104.3	121.0	7.8	8.0	158	0	45.0	80.0	45.0	95.0	25.0	28.0
97	5	7/21/97	BB,DC,SM	20.0	20.5	6.4	7.9	10.10	12.20	74.6	94.1	7.4	7.8	*	*	45.0	110.0	45.0	110.0	20.0	21.0
97	5	8/4/97	BB,DC,SM	22.0	22.5	7.1	8.1	17.30	27.80	89.5	109.6	7.6	8.0	228	0	45.0	110.0	45.0	110.0	19.0	21.0
97	5	8/19/97	BB,SM,DC	20.0	23.5	6.3	9.0	20.80	28.50	78.1	124.4	7.4	8.1	98	112	45.0	97.5	45.0	125.0	18.0	24.0
97	5	9/3/97	BB,SM,DC	19.0	21.0	6.0	7.5	14.30	27.40	70.2	98.5	7.3	7.8	90	0	45.0	97.5	45.0	110.0	15.0	19.0
97	5	9/18/97	DC,JI,JI	18.0	22.0	5.8	8.8	16.10	28.50	67.3	118.5	7.4	7.9	0	0	45.0	BSV	45.0	145.0	20.0	27.0
97	5	10/2/97	DC,SM	9.0	12.5	8.2	9.4	9.95	27.50	75.5	104.4	7.3	8.0	28	-0	45.0	80.0	45.0	105.0	6.0	14.0
97	5	10/17/97	BB,DC,SM	11.0	13.5	7.1	9.2	18.50	29.50	72.1	105.7	7.6	8.0	190	8	45.0	BSV	45.0	150.0	6.0	14.0
97	5	11/3/97	BB,DC,SM	11.0	13.0	8.0	9.3	0.60	17.70	73.1	98.2	6.9	7.7	570	110	45.0	80.0	45.0	135.0	17.0	13.5
98	5	5/12/98	DC,BB,SM	10.5	15.0	10.2	9.7	0.28	8.90	92.0	101.5	7.3	7.6	310	114	BSV	37.5	45.0	130.0	11.0	13.0
98	5	6/10/98	BB,SM,DC	18.0	23.0	6.5	9.2	4.50	21.15	70.6	120.8	7.4	8.0	34	2	45.0	57.5	45.0	95.0	19.0	24.0
98	5	7/9/98	SM,DC	20.0	26.5	5.8	7.2	1.45	12.00	64.6	95.6	7.3	*	130	10	BSV	75.0	45.0	115.0	18.0	24.0
98	5	8/10/98	BB,DC	25.0	27.0	5.5	7.9	15.10	27.30	72.4	115.2	7.4	7.9	148	2	45.0	70.0	45.0	115.0	27.0	31.0
98	5	9/9/98	BB,SM,DC	19.0	19.0	7.2	8.2	20.00	27.55	87.1	103.8	7.6	8.0	0	2	45.0	100.0	45.0	155.0	18.5	15.0
98	5	10/7/98	BB,DC	9.0	12.5	9.1	9.8	19.60	30.08	89.0	110.7	7.8	8.3	38	0	45.0	95.0	45.0	95.0	6.0	15.0
98	5	11/5/98	BB,SM,DC	4.0	7.0	9.4	10.3	9.80	23.05	76.5	99.6	7.3	7.9	8	0	45.0	40.0	45.0	150.0	4.0	9.0
99	5	4/29/99	BB,SM,DC	10.0	12.5	8.4	9.3	6.15	21.60	99.51	77.45	7.4	7.7	0	4	45.0	52.5	45.0	120.0	9.0	13.0
99	5	5/17/99	SM,DC	16.5	19	6.4	8.1	11.20	24.30	70.01	100.54	7.2	7.6	44	20	46	67.5	45	115.0	17.5	18.0
99	5	6/15/99	BB,SM,DC,NvBB,SM,DC,NA	22.5	23.5	6.8	7.3	20.10	28.50	87.92	100.94	7.4	7.8	660	26	45.0	50.0	45.0	130.0	22.5	25.0
99	5	7/13/99	BB,SM,DC	20.0	20.5	5.1	6.6	22.65	30.65	63.89	87.9	7.3	7.6	68	4	45.0	115.0	45.0	115.0	17.0	20.0
99	5	8/12/99	SM,DC,BB	19.0	22.5	4.5	8.8	25.25	30.90	56.18	121.28	7.3	7.9	80	0	45.0	95.0	45.0	130.0	20.0	28.0
99	5	9/13/99	BB,DC	20.0	23.0	6.6	9.2	5.65	28.30	75.12	125.94	7.2	8.0	380	2	45.0	115.0	45.0	115.0	22.0	21.0
99	5	10/12/99	SM,DC	11.0	13.0	7.5	10.0	10.80	25.55	72.71	110.88	7.6	8.2	20	2	45.0	85.0	45.0	130.0	10.0	15.0
99	5	11/9/99	BB,SM,DC	3.0	6.5	9.6	10.7	4.10	20.05	73.50	98.44	7.5	8.4	50	10	45.0	65.0	45.0	130.0	1.0	11.0
00	5	4/19/00	BB,SM,DC	8.00	7.00	9.40	10.40	4.20	16.00	81.73	94.82	7.40	7.80	16.00	10.00	45.00	55.00	45.00	105.00	4.00	6.00
00	5	5/18/00	BB,SM,DC	15.00	17.00	7.50	8.20	1.00	17.85	75.13	94.18	7.40	7.80	24.00	2.00	45.00	55.00	45.00	85.00	17.00	22.00
00	5	6/19/00	NH,DC	20.50	23.50	5.60	7.30	3.10	19.10	63.49	95.57	7.20	7.60	120.00	120.00	50.00	57.50	50.00	75.00	20.00	22.50
00	5	7/17/00	BB,SM,DC	18.00	20.00	5.90	7.10	0.30	20.60	62.70	87.88	7.40	7.80	120.00	190.00	45.00	75.00	45.00	75.00	16.00	17.00
00	5	8/15/00	BB,SM	19.00	20.50	6.90	6.80	0.60	18.00	74.94	83.69	7.40	7.60	380.00	46.00	45.00	85.00	45.00	90.00	19.00	21.50
00	5	9/14/00	BB,DC,SM	16.00	22.50	6.70	9.40	8.95	28.20	71.63	127.45	7.30	8.10	370.00	4.00	45.00	90.00	45.00	90.00	17.00	22.00
00	5	10/16/00	BB,SM,DC	11.00	11.00	7.40	8.40	12.20	26.90	72.34	90.02	7.40	7.80	116.00	4.00	50.00	105.00	50.00	105.00	6.00	3.00
01	5	4/24/01	BB,SM,DC	15.0	19.0	7.9	9.4	1.20	10.40	79.2	107.7	7.3	7.7	40	10	45.0	100.0	45.0	100.0	6.00	9.00
01	5	5/23/01	BB,SM,DC	13.0	16.0	6.6	8.0	9.15	23.00	66.3	92.9	7.3	7.6	>120	2	45.0	60.0	45.0	90.0	13.0	16.0
01	5	6/21/01	BB,SM,DC	22.5	21.0	6.2	6.7	0.95	7.60	72.2	78.6	7.2	7.4	0	0	45.0	45.0	45.0	80.0	21.0	18.0
01	5	7/23/01	BB,SM	25.0	28.0	7.0	8.3	15.80	27.30	92.4	123.1	7.6	7.9	0	0	45.0	100.0	45.0	105.0	30.5	30.5
01	5	8/29/01	BB,SM,DC	23.0	24.0	4.5	7.4	22.90	29.30	59.7	103.7	7.2	7.7	0	12	45.0	115.0	45.0	115.0	20.0	32.0
01	5	9/18/00	BB,SM,DC	16.0	20.0	7.1	8.7	26.25	30.85	84.1	114.6	7.4	7.7	74	6	45.0	115.0	45.0	115.0	16.0	27.0
01	5	10/17/01	BB,SM,DC	12.0	14.0	7.3	8.6	16.14	28.85	74.7	99.5	7.4	7.8	>120	40	45.0	130.0	45.0	130.0	15.0	12.0
01	5	11/1/01	BB,SM,DC	6.0	8.0	9.3	9.8	14.85	28.60	82.2	99.3	7.5	7.8	>120	0	45.0	90.0	45.0	90.0	1.00	1.00

Site 6 - Fox Pt

YEAR	SITE	DATE	SAMPLER-L	SAMPLER-H	WTEMP-L	WTEMP-H	DO-L	DO-H	SAL-L	SAL-H	SAT-L	SAT-H	pH-L	pH-H	FECAL-L	FECAL-H	LP-L	LP-H	DEPTH-L	DEPTH-H	ATEMP-L	ATEMP-H
					°C	°C	ppm	ppm	g/L	g/L	%	%			CFU/100ml	CFU/100ml	em	em	ftm	ftm	°C	°C
99	6	10/12/99	BH, NC	BH, NC	13.0	12.0	8.1	7.3	27.15	30.00	90.74	81.38	7.9	7.8	4	0	285.0	290.0	343.0	750.0	8.0	13.0
99	6	11/9/99	BH, NC	BH, NC	7.0	8.0	9.2	9.6	23.70	27.95	89.34	96.88			11	8	215.0	295.0	565.0	LOST	0.0	6.0
00	6	4/19/00	DY, HC, BH	BH	14.00	7.00	10.70	11.10	21.65	24.70	101.16	107.08	7.80	8.00	0.00	0.00	87.50	137.50	545.00	770.00	4.00	5.00
00	6	5/18/00	BH, SS	BH, CD	18.00	13.00	9.10	9.20	20.40	24.20	99.79	101.14	7.60	7.80	2.00	1.00	142.00	200.00	540.00	770.00	25.00	19.00
00	6	6/19/00	MW, SW, SW, BH, SS	BH, SS	18.00	18.00	7.70	8.10	20.40	26.20	93.81	99.77	7.60	7.80	3.00	2.00	140.00	187.00	250.00	710.00	21.00	21.00
00	6	7/17/00	MW, SW, SW, BH, SS	MW, SW, SW, SS	19.00	18.00	7.50	8.10	29.20	29.20	93.93	101.65	7.60	7.80	3.00	13.00	153.00	233.00	565.00	725.00	15.00	18.00
00	6	8/15/00	MW, SW, SW, BH	MW, SW, SW, SS	20.00	19.00	6.40	6.80	26.30	28.50	81.95	87.41	7.70	7.30	3.00	4.00	155.00	240.00	555.00	745.00	15.00	20.00
00	6	9/14/00	BH, MW, SW, SW	BH	19.00	17.50	7.60	7.40	30.10	29.90	97.75	92.37	7.70	7.30	0.00	0.00	232.00	267.00	550.00	880.00	16.00	22.00
00	6	10/16/00	BH, MW, SW, SW	MW, SW, SW, D, DP	12.00	12.00	8.40	8.20	28.40	30.00	92.89	91.63	7.10	7.60	3.00	11.00	215.00	257.00	565.00	750.00	3.00	3.00
00	6	11/13/00	MW, SW, SW, BH, SS	SW, SW, MW, SM	9.00	10.00	9.20	9.60	24.80	22.30	93.01	91.57	7.50	7.50	1.00	21.00	260.00	275.00	545.00	785.00	2.00	10.00
01	6	4/24/01	MW, SW, SW, BH	MW, SW, SW	12.0	11.0	9.8	10.3	12.30	19.10	98.0	105.0	7.7	7.9	0	2	198.0	190.0	565.0	760.0	15.0	30.0
01	6	5/23/01	MW, SW, SW, BH	MW, SW, SW, BH	14.0	13.0	7.8	8.3	25.60	27.45	88.3	93.2	7.6	7.9	0	3	130.0	215.0	550.0	745.0	13.0	16.0
01	6	6/21/01	MW, SW, SW, BH	MW, SW, SW, BH	21.0	18.0	6.8	7.5	22.60	24.55	86.8	91.5	7.6	7.5	4	14	107.0	140.0	315.0	725.0	17.0	17.0
01	6	7/23/01	MW, SW, SW	MW, SW	21.0	17.0	8.7	8.5	27.80	29.50	114.5	104.8	7.7	7.6			136.0	247.5	490.0	755.0	28.0	29.0
01	6	8/20/01	MW, SW, SW, BH	BH	20.0	16.0	7.2	7.7	30.50	30.30	94.6	93.6	7.8	7.8	2	*	200.0	242.0	515.0	780.0	20.0	22.0
01	6	9/18/01	MW, SW, SW, BH	MW, SW, SW, BH	16.0	16.0	8.0	7.9	32.90	33.45	98.9	98.0	7.8	7.9	1	0	255.0	290.0	530.0	795.0	16.0	22.0
01	6	10/17/01	MW, SW, SW, BH	MW, SW, SW, BH	13.0	13.0	8.1	8.5	32.60	32.50	94.0	98.6	7.8	7.8	*	8	270.0	275.0	570.0	760.0	14.0	11.0
01	6	11/17/01	MW, BH	MW, BH, SW, SW, TK	9.0	9.5	9.0	8.5	30.90	31.40	94.8	90.8	7.9	7.8	1	1	310.0	370.0	555.0	770.0	8.0	12.0

Site 7 - Cedar Pt

YEAR	SITE	DATE	SAMPLER-L	SAMPLER-H	WTMP-L	WTMP-H	DO-L	DO-H	SAL-L	SAL-H	SAT-L	SAT-H	pH-L	pH-H	FECAL-L	FECAL-H	I-P-L	I-P-H	DEPTH-L	DEPTH-H	ATEMP-L	ATEMP-H
					°C	°C	ppm	ppm	ppt	ppt	%	%			CFU/100ML	CFU/100ML	cm	cm	cm	cm	°C	°C
97	7	10/1/97	GT, DT	BE, JK	18.0	9.20	9.00	32.60	32.95	124.7	115.7	7.4	7.0	5	0	105.0	330.0	105.0	330.0	2.0	15.5	
97	7	11/3/97	IL, BE	IL, BE	15.0	8.40	8.70	25.25	28.30	96.9	102.5	7.1	7.4	*	*	25.0	206.0	25.0	220.0	9.0	16.5	
98	7	5/12/98	DT, BN	BE, BN	11.0	8.60	9.10	14.80	17.80	85.4	94.1	7.1	6.7	68	29	130.0	135.0	130.0	150.0	13.0	18.5	
98	7	6/10/98	BN, GT, DT	BE, BN, DT	14.5	9.00	9.70	24.70	26.70	102.4	110.6	7.4	7.5	1	2	90.0	275.0	90.0	275.0	22.0	21.5	
98	7	7/9/98	DT, GT	BN, BE, IL	19.5	7.00	8.70	17.80	21.50	84.4	106.2	7.4	7.8	0	0	100.0	201.0	100.0	295.0	17.0	29.5	
98	7	8/10/98	DT, GT	EL, BE	20.0	7.20	7.20	28.90	29.60	93.7	94.1	7.8	7.9	6	2	97.0	292.5	97.0	290.0	25.0	41.0	
98	7	9/9/98	BN, BB	IL, BE	17.0	6.80	7.60	29.65	31.10	83.9	89.2	7.6	7.7	6	2	97.0	330.0	80.0	330.0	17.0	18.0	
98	7	10/7/98	IL, DT	EL, DT	10.5	8.40	8.50	30.00	31.25	90.9	91.7	7.6	8.1	2	0	90.0	330.0	90.0	330.0	9.0	19.0	
98	7	11/5/98	BT, BE	BE, BN	7.0	8.90	8.60	27.75	29.25	87.6	89.6	7.7	7.7	2	0	80.0	255.0	90.0	300.0	1.0	14.0	
99	7	4/29/99	BT, BE	BT, BE	9.5	9.60	9.30	25.40	27.80	98.53	102.20	7.8	8.0	4	0	100.0	255.0	100.0	300.0	8.0	15.0	
99	7	5/17/99	BT, BE	BT, BE, DO	14.0	8.20	9.00	27.40	29.00	93.95	106.53	7.7	7.8	0	4	65.0	300.0	65.0	300.0	21.0	21.0	
99	7	6/15/99	BE, BT, LH	BE, BT, LH, DO	18.0	7.30	7.40	29.75	29.80	94.57	93.21	7.8	8.0	107	177	80.0	290.0	80.0	290.0	23.0	27.5	
99	7	7/13/99	BE	BE, LH	16.0	8.80	8.10	29.90	31.45	110.92	99.17	7.8	8.0	12	3	80.0	290.0	80.0	290.0	17	23.0	
99	7	8/12/99	LH, EL	EL, LH	17	6.30	7.30	32.00	30.70	81.44	90.71	7.8	7.8	2	0	85	315	85	315	20	30.5	
99	7	9/13/99	LH, EL	EL, LH	21.0	6.00	7.00	30.20	30.30	80.14	89.29	7.6	7.7	25	19	90.0	300.0	90.0	300.0	29.5	22.0	
99	7	10/12/99	BE, LH	BE, LH	12.0	8.20	8.40	27.80	28.85	90.32	93.16	7.8	7.7	*	*	90.0	280.0	90.0	280.0	8.0	16.0	
99	7	11/9/99	BE, LH, TH	LH, BE	6.5	8.90	8.90	24.35	27.25	84.64	87.34	7.1	7.7	6	14	105.0	285.0	105.0	310.0	2.0	11.0	
00	7	4/19/00	LH, BW	LH	8.00	9.90	10.90	24.70	29.80	97.75	108.85	7.60	7.80	1.00	2.00	6.00	90.0	6.00	175.00	9.00	12.00	
00	7	5/18/00	BE, LH	BW, BE	14.00	*	8.50	21.05	*	93.58	*	7.10	*	1.00	*	90.00	*	90.00	*	15.00	*	
00	7	6/19/00	BE, JL, LH	BE, LH	18.00	3.30	8.40	24.30	25.00	40.18	102.71	7.60	7.80	9.00	9.00	95.00	90.00	95.00	175.00	27.50	28.50	
00	7	7/17/00	BE, LH, TH, BW	LH, MW, BW, BE	18.00	7.30	7.00	28.75	29.20	91.35	86.99	7.60	7.50	76.00	120.00	105.00	228.00	105.00	285.00	19.00	28.00	
00	7	8/15/00	BE, BW	BE, BW	20.50	7.10	7.30	27.30	27.20	92.31	93.98	7.50	7.80	4.00	6.00	90.00	245.00	90.00	290.00	21.00	23.00	
00	7	9/14/00	BW, DDP, JL	BE, BW	18.00	7.80	7.40	29.80	31.20	100.14	94.04	7.70	*	8.00	6.00	85.00	340.00	85.00	340.00	17.00	24.00	
00	7	10/16/00	BE, IL, RW	BE, BW	17.00	8.20	8.30	29.50	32.90	102.10	104.60	7.50	7.00	8.00	8.00	105.00	310.00	105.00	310.00	9.50	10.00	
00	7	11/13/00	BE, BW, JL	BE, JL	8.00	6.20	9.00	24.60	28.10	61.18	94.04	7.30	7.30	10.00	10.00	95.00	255.00	95.00	340.00	2.00	10.00	
01	7	4/24/01	JL, RR	CM, DP, RR	11.0	8.90	10.95	21.70	19.60	92.24	109.51	7.6	7.7	2	3	105.0	213.5	105.0	300.0	15.0	32.0	
01	7	5/23/01	BT, RR	JL, RR	14.0	7.22	7.80	25.60	27.80	81.78	87.75	7.6	7.8	0	0	95.0	210.0	95.0	300.0	15.0	18.0	
01	7	6/21/01	JL, SJ	SW, JL	20.0	6.30	7.60	23.30	25.10	79.23	91.18	7.3	7.8	60	0	80.0	175.0	80.0	290.0	18.0	16.0	
01	7	7/23/01	JL, JJ	JL, SJ	22.0	6.90	7.40	29.50	30.20	93.45	97.04	7.8	7.1	22	2	85.0	295.0	85.0	310.0	31.0	34.0	
01	7	8/20/01	LP, RR	LP, RR	18.5	6.30	9.00	30.20	30.30	80.31	109.38	7.5	7.7	22	2	90.0	315.0	90.0	355.0	21.0	25.5	
01	7	9/18/01	RR	RR	15.0	7.10	7.50	31.10	32.10	85.02	90.40	7.1	7.7	4	1	85.0	315.0	85.0	320.0	14.5	27.0	
01	7	10/17/01	RR, NH	RR, JK	11.0	7.80	10.70	30.00	31.70	88.08	118.38	7.7	7.7	13	13	130.0	265.0	130.0	265.0	12.0	13.0	
01	7	11/1/01	JL, RR	JL, RR	9.0	8.45	8.30	29.80	31.20	88.33	88.56	7.5	7.6	2	1	105.0	300.0	105.0	300.0	7.0	11.0	

Site 9 - Cochecho River

YEAR	DATE	SAMPLER-L	SAMPLER-H	WTMP-L	WTMP-H	DO-L	DO-H	SAL-L	SAL-H	SAT-L	SAT-H	pH-L	pH-H	FECAL-L	FECAL-H	LPL-L	LPL-H	DEPTH-L	DEPTH-H	ATEMP-L	ATEMP-H
				oC	oC	ppm	ppm	ppt	ppt	%	%			CFU/100ML	CFU/100ML	cm	cm			oC	oC
91	9/4/1991	NN JH	NN JH	9.0	11.0	10.20	10.00	3.30	6.20	90.5	94.4	7.1	7.0	*	*	*	*	*	*	0.0	10.0
91	9/4/28/91	AR JH	AR JH	13.0	14.0	9.00	9.20	2.80	5.00	87.2	92.2	7.4	7.2	*	*	*	*	*	*	6.0	11.0
91	9/5/13/91	NN JHCC	NN JHCC	16.0	18.0	8.30	8.20	3.20	5.80	85.9	89.8	7.1	6.9	*	*	*	*	*	*	10.0	22.0
91	9/5/27/91	JH NN	JH NN	18.0	21.0	5.80	6.00	7.60	11.60	64.1	71.9	7.0	7.2	*	*	*	*	*	*	13.0	20.0
91	9/6/13/91	JH JJ NN	JH JJ NN	19.5	23.0	4.55	5.60	9.90	4.60	52.5	67.1	7.1	7.2	*	*	*	*	*	*	18.0	26.0
91	9/6/26/91	NN JH	NN JH	19.5	22.5	7.30	9.95	9.30	19.10	83.9	127.9	7.4	7.8	*	*	*	*	*	*	16.0	27.0
91	9/7/11/91	NN JH	NN JH	19.5	21.0	6.30	6.85	16.60	24.50	75.5	88.4	7.2	7.5	*	*	*	*	*	*	17.0	22.0
91	9/7/26/91	NN JH	NN JH	23.5	23.0	5.80	6.30	18.00	25.40	75.5	84.8	7.5	7.6	*	*	*	*	*	*	20.0	23.0
91	9/8/9/91	JH NN CN	JH NN CN	21.5	21.5	6.70	7.00	19.50	27.20	84.7	92.6	7.4	7.6	*	*	*	*	*	*	17.0	24.0
91	9/8/25/91	NN JH	NN JH	19.0	21.0	7.00	6.30	2.10	3.40	76.6	72.2	6.9	6.9	*	*	*	*	*	*	13.0	24.0
91	9/9/7/91	NN JH	NN JH	18.0	22.0	6.00	7.90	7.20	13.60	66.2	97.6	6.8	6.8	*	*	*	*	*	*	12.0	28.0
91	9/9/23/91	NN JH	NN JH	14.5	17.0	7.10	7.70	6.30	10.60	72.4	84.8	7.2	7.0	*	*	*	*	*	*	1.0	16.0
91	9/10/6/91	NN JH	NN JH	15.0	15.0	8.50	8.00	3.00	5.10	86.1	82.0	7.0	7.0	*	*	*	*	*	*	14.0	16.0
91	9/10/22/91	JH SJ NN	JH SJ NN	10.0	11.0	10.00	8.90	2.20	4.80	90.1	83.3	7.3	7.0	*	*	*	*	*	*	5.0	18.5
91	9/11/5/91	NN JH	NN JH	7.0	8.0	10.00	10.00	4.80	6.70	85.2	88.2	7.2	7.0	*	*	*	*	*	*	-2.0	4.0
92	9/4/16/92	NN SS	NN SS	5.5	6.0	11.20	11.90	5.40	8.00	92.2	100.8	7.3	6.9	*	*	*	*	*	*	-8.0	5.5
92	9/5/2/92	JH NN	JH NN	11.0	12.5	9.40	9.50	4.80	6.25	88.0	92.8	7.0	7.0	*	*	*	*	*	*	10.0	16.0
92	9/5/16/92	NN	NN JT	15.0	13.5	8.50	8.35	6.30	9.20	87.7	88.5	7.4	7.3	*	*	*	*	*	*	9.5	16.0
92	9/6/1/92	NN	SS CC	14.0	13.5	7.60	8.10	9.90	14.50	78.3	84.8	7.1	7.3	*	*	*	*	*	*	10.0	10.0
92	9/6/14/92	NN	JH	19.5	22.5	6.40	6.50	7.00	11.50	72.7	80.1	7.1	7.1	*	*	*	*	*	*	19.0	28.0
92	9/6/29/92	SS NN	SS NN	17.5	22.0	6.70	6.50	11.10	19.50	74.8	83.0	6.7	7.5	*	*	*	*	*	*	13.5	28.0
92	9/7/14/92	NN	NN SS	20.5	20.0	6.70	7.15	17.90	20.50	82.4	88.4	7.6	7.6	49	24	*	*	*	*	16.0	18.0
92	9/7/29/92	NN	JT NN	20.5	22.0	7.10	9.10	15.30	19.10	86.0	115.9	7.5	7.5	52	24	*	*	*	*	15.0	27.0
92	9/8/12/92	NN	NN SS	20.5	22.0	6.50	8.30	9.80	16.70	76.4	104.3	7.0	7.4	190	22	*	*	*	*	14.0	24.0
92	9/8/27/92	CC JJ	SS	22.0	25.0	6.90	8.40	9.90	17.40	83.5	111.9	6.8	7.5	222	800	*	*	*	*	22.0	27.0
92	9/9/10/92	SS	SS	19.0	23.0	8.30	8.10	9.20	16.10	94.4	103.3	6.9	6.4	800	800	*	*	*	*	20.0	27.0
92	9/9/26/92	NN	NN CN	14.5	16.0	8.00	8.60	12.60	20.30	84.6	98.2	7.0	7.6	*	*	*	*	*	*	10.5	17.0
92	9/10/11/92	SS	NN	13.0	14.0	8.20	8.40	7.90	9.40	81.7	86.3	7.0	7.1	*	*	*	*	*	*	13.0	18.0
92	9/10/24/92	NN	NN SS	9.0	10.5	10.20	8.60	6.80	13.50	92.2	83.8	7.0	7.1	*	*	*	*	*	*	7.0	15.0
92	9/11/9/92	SS	SS	3.0	5.0	11.30	11.50	5.40	5.90	87.2	93.8	6.6	6.9	170	50	*	*	*	*	-6.0	2.0
93	9/4/21/93	NN JM	NN JM	10.0	11.5	10.10	10.20	0.00	0.00	89.9	94.0	7.1	7.2	20	70	17.0	115.0	180.0	17.0	16.0	19.0
93	9/5/6/93	NN JM	NN JM	17.0	17.0	8.90	8.50	0.00	2.90	92.5	89.7	7.1	7.0	420	100	24.0	100.0	250.0	24.0	17.0	27.0
93	9/5/20/93	NN JM	NN JM	15.0	15.0	7.80	7.60	4.70	9.90	79.7	80.0	7.0	6.9	250	140	20.0	118.0	400.0	20.0	11.0	13.0
93	9/6/4/93	NN JM	NN JM	15.0	17.0	8.10	8.00	5.90	10.80	83.4	88.2	6.9	7.0	240	100	20.0	150.0	200.0	20.0	10.0	20.0
93	9/6/23/93	JM BK	JM BK	21.0	20.5	6.50	7.90	14.00	18.30	79.0	97.4	7.0	7.3	300	100	*	*	175.0	*	19.0	21.0
93	9/7/6/93	JM	JM	24.0	26.5	7.50	8.20	12.80	20.40	95.7	114.0	7.6	7.6	50	20	*	*	400.0	*	30.0	32.0
93	9/7/23/93	NN JM	NN JM	22.0	22.0	6.80	7.20	18.50	24.90	86.3	94.9	7.1	7.6	310	40	*	*	423.0	*	20.0	23.0
93	9/8/3/93	NN JM	NN JM	23.0	26.0	7.30	9.50	12.40	21.10	91.2	131.5	7.3	7.7	*	*	*	*	400.0	*	22.0	28.0
93	9/8/19/93	NN JM	NN JM	22.0	24.0	5.30	*	15.40	21.70	66.1	7.1	7.5	470	10	*	*	465.0	*	18.0	22.0	
93	9/9/2/93	NN	NN	22.0	22.0	5.60	8.80	20.00	25.20	71.7	116.2	7.4	7.5	180	0	40.0	195.0	40.0	40.0	19.5	22.0
93	9/9/20/93	JM	JM	15.5	16.0	7.00	9.60	17.00	24.50	77.6	112.5	7.3	7.8	320	30	*	*	440.0	*	12.0	15.0
93	9/10/4/93	JM	JM	12.5	15.0	8.50	9.90	8.40	15.40	84.0	107.6	7.1	7.6	440	80	*	*	365.0	*	13.0	20.5
93	9/10/18/93	JM	JM	9.5	11.5	*	8.70	4.30	13.30	86.6	7.0	7.3	600	120	*	*	460.0	*	17.0	17.0	
93	9/11/9/93	JM IL	JM IL	6.0	2.0	11.10	11.00	3.80	5.00	91.7	82.4	6.9	7.5	170	60	*	*	390.0	*	7.0	-4.0
94	9/4/26/94	NN	NN RJ	9.0	9.0	10.20	10.10	1.60	5.40	89.5	90.6	7.3	7.3	210	38	30.0	13.0	30.0	30.0	5.0	6.0
94	9/5/10/94	BK JM	BK RJ	11.5	12.0	10.10	9.50	0.00	3.40	93.1	90.3	7.1	80	130	80	*	*	550.0	*	12.0	16.0
94	9/5/23/94	RJ BK	RJ BK	16.0	15.0	8.20	8.00	2.40	5.00	84.5	81.9	6.9	7.3	210	78	10.0	110.0	600.0	10.0	13.0	13.0
94	9/6/9/94	NN	RJ NN	17.0	20.0	7.30	7.20	7.00	14.50	78.8	86.0	7.3	7.5	220	38	30.0	145.0	310.0	30.0	16.0	23.0
94	9/6/23/94	JM	RJ CC JM	21.0	22.0	5.80	6.60	13.00	20.90	70.1	85.0	7.1	7.2	420	50	*	*	*	*	16.0	24.0
94	9/7/11/94	NN	NN	23.5	25.0	6.80	8.30	13.90	20.90	86.5	112.8	7.8	7.9	20	20	20.0	120.0	285.0	20.0	23.0	26.0
94	9/7/23/94	JM	JM KG	24.0	25.0	7.40	6.70	13.60	*	94.8	7.7	7.7	70	10	*	*	445.0	*	22.0	27.0	
94	9/8/9/94	BK CC	BK	20.5	23.0	7.50	7.70	15.60	25.50	91.0	103.7	7.7	7.8	600	0	*	*	*	*	16.0	23.5
94	9/8/22/94	NN	RJ NN	20.5	20.0	7.20	8.10	8.80	16.60	84.2	98.0	7.3	7.3	*	*	40.0	130.0	*	40.0	18.0	18.0

Site 9 - Cochecho River

YEAR	SITE	DATE	SAMPLER-L	WTMP-H	WTMP-L	DO-H	SAL-H	SAL-L	SAT-H	SAT-L	pH-H	FECAL-L	FECAL-H	LP-L	LP-H	DEPTH-L	DEPTH-H	ATEMP-L	ATEMP-H
				oC	oC	ppm	ppt	ppt	%	%		CFU/100ML	CFU/100ML	cm				oc	
											TNTC	TNTC							
94	9	9/6/94	WK	15.0	17.5	7.80	10.60	14.10	24.00	84.1	127.6	7.7	7.4	*	*	*	*	11.5	17.0
94	9	9/21/94	BKJM	16.0	19.0	8.00	10.70	8.90	19.10	85.5	128.8	7.5	8.7	*	*	*	*	9.0	22.0
94	9	10/6/94	NN	11.0	14.0	7.60	9.00	8.10	13.90	72.5	94.9	6.9	7.8	11	20.0	95.0	20.0	4.0	9.0
94	9	10/20/94	BPBK	11.0	12.0	8.90	9.10	7.00	4.60	84.4	87.1	7.2	7.5	90	40.0	205.0	40.0	13.0	13.5
94	9	11/7/94	NNJM	9.5	10.0	9.00	8.80	10.70	17.10	84.2	86.6	6.9	7.5	380	*	145.0	*	7.0	9.0
95	9	4/18/95	BKJM	10.0	9.0	10.90	10.40	1.90	8.10	98.09	94.76	7.1	7.2	26	11	30.0	30.0	10.0	11.0
95	9	5/1/95	JM	10.0	11.0	9.85	9.80	4.40	9.70	89.91	94.40	7.0	7.0	NV	25.0	157.5	40.0	1.0	10.0
95	9	5/15/95	JM	7.0	8.0	8.50	9.30	5.40	11.20	72.64	84.30	7.0	7.4	130	30.0	102.0	25.0	9.0	6.0
95	9	5/30/95	JM	17.0	19.0	7.00	7.40	4.20	8.80	74.42	84.01	6.9	7.4	130	30.0	30.0	30.0	18.0	23.0
95	9	6/13/95	BKJM	18.0	19.5	7.50	6.60	6.80	13.70	82.34	77.76	7.0	7.3	43	80	117.5	30.0	15.0	18.5
95	9	6/27/95	NNJM	20.5	19.0	7.00	7.50	10.10	20.80	82.41	91.17	7.4	7.5	570	NV	420.0	40.0	17.5	*
95	9	7/12/95	NNWK	21.0	22.5	6.00	6.20	14.00	25.40	72.88	82.67	7.6	8.5	400	20	35.0	35.0	17.5	*
95	9	7/27/95	BKDB	23.5	27.5	7.00	7.50	9.80	17.20	87.06	104.26	7.6	7.6	2600	110	40.0	40.0	22.0	27.0
95	9	8/10/95	LMNN	14.5	18.5	6.60	7.00	9.90	16.30	68.73	82.08	7.4	7.6	240	10	40.0	40.0	15.0	25.0
95	9	8/28/95	LMBK	12.0	13.5	7.90	10.00	17.40	23.65	81.49	110.71	7.9	8.2	NV	NV	40.0	40.0	16.5	21.5
95	9	9/1/95	WKJM	9.0	19.0	7.80	9.80	17.60	27.80	75.30	124.27	7.8	8.0	140	0	50.0	50.0	10.0	19.0
95	9	9/26/95	BKJM	8.0	8.0	6.80	9.20	16.90	24.60	63.85	90.78	7.6	7.6	800	0	40.0	40.0	13.5	14.0
95	9	10/10/95	JM	5.0	9.0	8.40	13.60	10.40	17.00	70.40	130.80	7.5	8.4	230	0	40.0	40.0	7.0	16.0
95	9	10/26/95	BKJM	4.0	6.0	9.10	9.00	1.60	4.10	70.47	74.45	7.1	7.1	320	210	40.0	40.0	4.0	14.0
95	9	11/9/95	JMLM	-1.0	-1.0	11.70	12.00	0.60	0.60	105.1	101.9	7.0	7.1	130	110	40.0	40.0	1.0	2.0
96	9	4/18/96	BKJM	6.0	7.0	13.00	12.30	0.20	0.10	96.6	91.6	7.1	7.4	60	30	30.0	30.0	5.0	13.0
96	9	5/6/96	LJM	11.0	11.5	10.60	9.90	0.00	0.60	96.6	91.6	7.1	7.4	60	30	30.0	30.0	3.0	7.0
96	9	5/20/96	JMLM	15.5	18	9.20	9.00	8.60	0.80	97.1	95.9	7.3	7.3	120	190	30.0	30.0	16	30
96	9	6/3/96	JMLM	19	19	7.70	7.80	4.40	6.20	85.3	87.3	7	7.1	160	20	38.0	35.0	16	15
96	9	6/17/96	JMLM	22	24	6.70	7.50	6.00	13.40	79.4	96.0	7.4	7.4	600	10	40.0	40.0	20	26
96	9	7/1/96	LMBK	19.5	*	6.70	*	7.80	*	76.4	6.9	*	*	64	50.0	465.0	40.0	16	*
96	9	7/15/96	NN	20	21	8.40	8.50	0.00	0.10	92.8	95.8	7.1	7.3	6500	3000	10.0	10.0	19	23
96	9	7/30/96	NNJM	21	22	6.90	6.90	6.10	12.60	80.3	84.7	7.2	7.6	260	30	20.0	20.0	18	25
96	9	8/14/96	WKMK	20	25	6.60	7.80	7.50	13.70	75.9	101.8	7.4	7.8	550	40	30.0	30.0	15	25
96	9	8/29/96	NNJM	20.5	23	7.50	7.30	14.20	22.90	90.3	96.8	7.7	7.6	390	25	40.0	40.0	14	26
96	9	9/16/96	LMJM	18	19	5.70	6.60	21.30	23.00	68.2	81.3	7.1	7.5	50	0	25.0	25.0	17.5	17.5
96	9	9/30/96	LM	15	16	8.20	8.20	11.80	19.70	87.3	93.3	7.1	7.6	0	10	40.0	40.0	14	16
96	9	10/15/96	BBGA	2	10	9.50	9.60	9.20	5.00	73.1	87.9	6.9	7.4	500	8	20.0	20.0	2	9
96	9	10/29/96	JM	9	*	10.70	*	0.00	*	93.0	7.2	*	*	92	*	25.0	25.0	8	*
96	9	11/6/96	JM	6.5	6	12.00	12.10	1.60	0.20	99.0	97.8	*	*	170	30.0	132.5	30.0	9	6
97	9	4/23/97	JM, NN	8.5	10.0	11.00	10.90	0.00	0.00	94.5	97.0	7.4	6.9	40	70	35.0	35.0	10.0	14.0
97	9	5/6/97	JM	10.0	11.0	10.00	10.10	0.60	1.20	89.3	92.7	7.1	6.9	30	20	30.0	30.0	9.0	10.0
97	9	5/22/97	JM, WT	12.5	13.0	8.60	9.20	2.10	4.30	82.0	89.8	7.1	*	40	120	30.0	30.0	11.0	15.0
97	9	6/5/97	JM, LM	15.0	17.0	8.40	8.20	5.95	10.25	86.5	90.1	7.3	7.3	*	*	25.0	25.0	15.0	16.0
97	9	6/23/97	LM, BT	23.0	24.0	6.90	7.10	9.80	15.90	85.0	92.1	*	7.4	330	10	30.0	30.0	24.0	26.0
97	9	7/7/97	LM	23.0	25.0	7.60	11.80	7.00	14.30	92.3	184.7	7.5	8.2	100	30	30.0	30.0	23.0	27.0
97	9	7/21/97	NN, BT	20.5	21.0	6.20	6.40	6.10	10.10	71.4	76.1	6.6	6.6	168	56	20.0	20.0	17.0	17.0
97	9	8/4/97	LM, AM	21.5	22.0	7.80	7.40	12.45	21.20	94.8	95.4	6.9	7.4	1220	20	10.0	10.0	13.0	21.0
97	9	8/19/97	NN, WMK	21.0	23.0	6.60	7.10	14.30	21.60	80.3	93.4	6.9	7.0	0	0	30.0	30.0	16.0	23.0
97	9	9/3/97	BT, DB	20.0	21.0	7.00	7.10	13.60	17.10	80.8	92.7	7.1	7.1	220	30	10.0	10.0	16.0	19.0
97	9	9/18/97	JM, BT	18.5	21.0	6.70	7.50	13.60	17.10	80.8	92.7	7.1	7.1	*	*	10.0	10.0	17.0	22.2
97	9	10/2/97	BT, JM	10.0	14.5	8.10	8.50	12.55	19.20	77.6	93.5	7.4	7.6	400	0	30.0	30.0	15.0	17.5
97	9	10/17/97	JM, WT	12.0	13.5	10.80	9.10	6.80	13.25	104.6	94.6	7.3	7.8	200	*	35.0	35.0	5.0	14.0
97	9	11/3/97	WT, JM	10.0	11.0	8.90	10.10	0.30	0.60	79.4	92.3	7.3	7.0	100	800	17.5	17.5	8.0	15.0
98	9	5/12/98	MH, WT	12.0	14.0	9.80	9.90	0.00	0.00	91.4	96.5	7.4	7.5	80	60	10.0	10.0	11.0	12.0
98	9	6/10/98	WT, MH	15.0	21.0	7.50	7.40	6.40	8.60	77.4	87.3	7.1	7.1	50	30	15.0	147.5	16.0	23.0
98	9	7/9/98	MH, NN	21.0	25.0	7.30	6.90	1.75	4.90	83.0	86.0	7.2	7.2	40	20	15.0	135.0	17.0	23.0
98	9	8/10/98	NN, MH	24.0	25.0	7.30	7.50	4.70	21.40	89.2	102.2	7.6	7.8	120	0	55.0	90.0	25.0	26.0

Site 9 - Cochecho River

YEAR	SITE	DATE	SAMPLER-L	SAMPLER-H	WTMP-L	WTMP-H	WTMP-L	WTMP-H	DO-L	DO-H	SAL-L	SAL-H	SAT-L	SAT-H	pH-L	pH-H	FECAL-L	FECAL-H	LP-L	LP-H	DEPTH-L	DEPTH-H	ATEMP-L	ATEMP-H
					oC	oC	ppm	ppm	ppm	ppm	ppt	ppt	%	%			CFU/100ML	CFU/100ML	cm	cm			oC	oC
98	9	9/9/98	WT, MH	WT, WK	18.5	19.0	8.00	7.60	15.20	23.90	93.2	94.1	8.0	7.7	8.0	7.7	40	80	19.0	103.0	19.0	580.0	16.0	15.0
98	9	10/7/98	WT, MH	WT, MH	10.0	13.0	8.80	9.10	11.25	19.00	83.6	96.9	7.6	7.7	7.6	7.7	28	1	5.0	160.0	5.0	235.0	9.0	18.0
98	9	11/5/98	MH, FC	WT, CP	6.0	7.5	9.90	9.60	7.90	13.73	83.8	87.3	7.1	7.4	7.1	7.4	0	0	10.0	165.0	10.0	420.0	-1.0	8.0
99	9	4/29/99	NN, MH	NN, MH	10.0	12.0	9.60	9.50	5.90	12.35	88.19	95.06	7.4	7.6	7.4	7.6	0	0	30.0	150.0	30.0	225.0	8.0	13.0
99	9	5/17/99	MH, WT	WT, BK	13.5	17.0	7.80	7.80	9.60	17.40	82.82	89.35	7.4	7.4	7.4	7.4	30	0	10.0	97.5	10.0	265.0	15.0	19.0
99	9	6/15/99	WT, MH	WT, WT	23.0	23.0	6.60	6.70	15.15	19.45	83.75	87.10	8.6	7.6	8.6	7.6	0	0	10.0	80.0	10.0	380.0	21.0	27.0
99	9	7/13/99	MH, NN	WT, WK	21.0	21.0	7.60	7.20	16.60	24.70	93.68	93.03	7.6	7.8	7.6	7.8	0	0	15.0	160.0	15.0	340.0	17.0	20.0
99	9	8/12/99	MH, WT	WT, CD	20.0	25.0	6.20	6.60	16.70	24.15	75.03	91.35	7.3	7.5	7.3	7.5	100	0	10.0	150.0	10.0	400.0	20.0	29.5
99	9	9/13/99	MH, AR	WT, BK	21.5	21.5	6.10	6.40	15.70	21.64	79.22	7.7	7.8	7.8	7.8	500	300	15.0	107.5	15.0	190.0	19.0	22.0	
99	9	10/12/99	MH, CP	WT, WK	10.5	12.5	9.10	8.90	5.60	10.35	84.61	88.98	6.9	7.3	6.9	7.3	150	30	15.0	145.0	15.0	370.0	8.5	16.0
99	9	11/9/99	WT, MH	WT, MH	6.0	7.0	11.20	11.4	4.10	3.45	92.65	96.31	7.4	7.5	7.4	7.5	80	30	15.0	157.5	15.0	170.0	6.0	8.0
00	9	4/19/00	MH, FC	MH, KH	8.00	5.00	10.40	5.30	2.90	4.20	89.75	42.77	6.90	7.40	6.90	7.40	60	0	10.00	132.50	10.00	200.00	4.00	9.00
00	9	5/18/00	MF, FC	WT, LP	15.00	16.00	8.50	8.80	2.40	6.00	85.80	92.54	7.30	7.10	7.30	7.10	0	10	10.00	*	10.00	*	13.00	19.00
00	9	6/19/00	MH, FC	WT, LP	19.00	22.00	7.50	7.80	5.45	6.60	83.60	92.74	7.20	7.30	7.20	7.30	200	90	15.00	140.00	15.00	270.00	18.00	19.00
00	9	7/17/00	MH, FC	BK, LP	18.00	21.00	7.40	8.40	4.50	3.00	80.43	96.12	7.30	7.60	7.30	7.60	50	410	*	82.50	*	*	15.00	25.00
00	9	8/15/00	WT, FC	BK, LP	20.00	21.00	6.90	7.30	6.10	9.80	78.72	86.64	*	7.30	7.30	7.30	120	90	10.00	115.00	10.00	690.00	18.00	18.00
00	9	9/14/00	LP, WT	LP, SE	17.50	21.50	7.20	7.60	11.90	21.65	80.70	97.34	7.40	7.70	7.40	7.70	190	0	10.00	213.00	10.00	325.00	13.00	21.00
00	9	10/16/00	LP, WT	LP, SE	10.00	10.30	9.40	8.80	6.20	14.00	86.70	85.98	7.10	7.60	7.10	7.60	50	10	10.00	210.00	10.00	230.00	4.00	3.00
00	9	11/13/00	NN, WT	CD, SE, NN	7.50	9.00	10.50	10.20	1.50	2.25	88.78	92.47	6.90	6.80	6.90	6.80	90	30	3.00	80.00	3.00	360.00	3.00	8.00
01	9	4/24/01	NN	NN, JN	13.0	15.0	9.90	10.20	1.50	1.20	95.18	102.28	7.1	7.3	7.1	7.3	20	10	35.0	110.0	35.0	*	12.0	24.0
01	9	5/23/01	NN, LP	NN, LP	15.0	15.0	7.90	11.80	6.65	15.80	81.64	128.53	7.2	7.5	7.2	7.5	70	40	*	320.0	*	320.0	11.0	16.0
01	9	6/21/01	NN	NN, LP	22.0	21.5	6.40	6.20	5.00	9.10	75.45	74.00	7.2	7.1	7.2	7.1	10	180	47.0	80.0	47.0	265.0	17.0	19.0
01	9	7/23/01	NN	LP, NN	24.5	25.5	6.80	7.00	11.55	18.25	86.95	94.52	7.5	7.5	7.5	7.5	10	40.0	40.0	90.0	40.0	250.0	27.0	29.5
01	9	8/20/01	BK, NH	BK, NH	23.0	23.5	6.80	6.50	17.50	23.60	87.43	87.32	7.4	7.5	7.4	7.5	190	10	MUD	122.0	MUD	550.0	21.0	22.0
01	9	9/18/01	NH, DS, LS	NH, LS	17.5	20.0	7.00	7.30	22.85	25.45	83.65	92.99	7.1	7.6	7.1	7.6	40	0	<5	160.0	<5	460.0	12.0	23.0
01	9	10/17/01	NH, DS, LS	NH, DS	13.0	13.5	8.20	8.00	7.90	15.90	81.73	84.46	7.1	7.1	7.1	7.1	190	53	50.0	175.0	50.0	430.0	14.0	14.0
01	9	11/1/01	NH, LS, DS	NH, LS	12.9	9.5	9.80	9.40	8.15	15.48	96.74	91.54	6.8	6.9	6.8	6.9	460	100	50.0	250.0	50.0	380.0	7.0	13.0

Site 10 - Piscataqua River

YEAR	SITE	DATE	SAMPLER-L	SAMPLER-H	WTEMP-L °C	WTEMP-H °C	DO-L ppm	DO-H ppm	SAL-L ppt	SAL-H ppt	SAT-L %	SAT-H %	pH-L	pH-H	FECAL-L CFU/100ML	FECAL-H CFU/100ML	L-P-L cm	L-P-H cm	DEPTH-L cm	DEPTH-H cm	ATEMP-L °C	ATEMP-H °C
00	ID	09/14/00	MH, NN	MH, AR	19.0	20.0	7.10	7.40	24.30	30.40	88.13	97.16	7.5	7.9	4.00	0.00	100.0	205.0	100.0	310.0	13.0	23.0
00	ID	10/16/00	FC, KD	AR, CD, RB	10.0	11.0	8.20	8.30	18.40	27.40	81.40	89.24	7.3	7.8	10.00	6.00	80.0	268.0	80.0	320.0	6.0	5.0
00	ID	11/13/00	MH, FC	BT, MH	8.0	9.0	9.70	9.10	7.90	16.40	86.20	87.19	6.8	7.5	50.00	48.00	72.5	200.0	110.0	345.0	4.0	10.0
01	ID	04/24/01	FC, KD, MH	MH, PR	11.0	16.0	10.70	10.10	2.65	7.40	98.97	107.04	7.3	7.6	6	0	105.0	155.5	105.0	320.0	13.0	24.0
01	ID	05/23/01	FC, MH,	BK, MH	14.0	16.0	7.40	8.30	16.30	24.15	79.26	97.05	7.5	7.9	12	2	90.0	167.5	90.0	210.0	14.0	17.0
01	ID	06/21/01	MH, FC	PR, BK	22.0	20.0	6.30	7.10	13.20	19.10	77.64	87.11	7.4	8.0	18	20	60.0	100.0	75.0	290.0	18.0	18.0
01	ID	07/23/01	MH, BK	MH, PR	23.0	22.0	6.90	8.00	19.45	29.80	89.70	108.55	7.5	7.9	32	2	80.0	131.5	80.0	325.0	24.0	28.0
01	ID	08/20/01	MH	MH, LP	22.0	19.5	6.30	7.70	24.80	30.30	82.96	100.09	7.6	7.9	4	2	80.0	225.0	80.0	330.0	20.0	23.0
01	ID	09/18/01	MH	MH, AM	17.0	18.0	7.00	8.20	27.05	31.25	85.01	104.24	7.4	7.9	8	4	75.0	285.0	75.0	345.0	14.0	23.0
01	ID	10/17/01	MH	MH, KR, AM	13.0	13.0	7.20	8.20	22.25	30.80	78.19	94.07	7.7	7.9	8	0	100.0	232.5	100.0	355.0	13.0	14.3
01	ID	11/01/01	AK, LA, JK	MH, NH	8.0	10.0	9.50	9.40	19.50	29.55	90.68	100.29	7.0	7.9	4	0	200.0	307.0	200.0	307.0	7.5	13.0

Site 11- CML

YEAR	SITE	DATE	SAMPLER-L	SAMPLER-H	WTEMP-L	WTEMP-H	DO-L	DO-H	SAL-L	SAL-H	SAT-L	SAT-H	pH-L	pH-H	FECAL-L	FECAL-H	LPL	LPH	DEPTH-L	DEPTH-H	ATEMP-L	ATEMP-H
					oC	oC	ppm	ppm	ppt	ppt	%	%			CFU/100ML	CFU/100ML	cm	cm	cm	cm	oC	oC
97	11	10/02/97	LF, CH	LF, CH	10.00	13.00	7.60	8.00	31.30	31.90	82.05	92.45	*	*	4	0	265.0	432.5	265.0	540.0	5.0	15.0
97	11	10/17/97	LF, CH	LF, CH	11.00	14.00	8.70	9.10	31.50	31.45	96.12	107.03	7.8	7.8	1	9	246.0	342.5	245.0	595.0	7.0	15.0
97	11	11/03/97	LF, CH	LF, CH	11.00	11.50	8.70	8.70	30.00	29.65	95.16	95.96	7.4	7.6	*	3100	197.5	195.0	273.0	545.0	8.0	15.0
98	11	05/12/98	LF, CH	LF, CH	10.00	11.00	9.00	9.30	22.95	19.90	91.95	95.30	7.8	7.8	4	12	193.0	235.0	285.0	540.0	10.0	13.0
98	11	06/10/98	LF, LJ	LF, LJ	11.00	13.00	9.20	9.20	28.75	27.40	99.80	103.23	7.8	7.8	3	0	230.0	410.0	230.0	490.0	14.5	23.0
98	11	07/09/98	LF, LJ	CH, RB	15.00	17.00	8.00	7.50	25.90	25.10	92.67	98.98	8.0	7.8	0	0	215.0	377.0	245.0	525.0	17.0	22.0
98	11	08/10/98	LF, CH	CH	15.00	15.00	8.10	8.20	30.50	31.60	96.62	98.51	7.8	7.8	3	1	210.0	405.0	210.0	550.0	20.0	24.0
98	11	09/09/98	CH, LF	CH, LF	14.00	15.00	7.30	7.80	32.10	31.10	86.23	93.40	8.0	7.1	2	4	230.0	327.5	230.0	590.0	14.0	17.0
98	11	10/07/98	LF, CH	CH, JM	9.00	10.00	7.95	8.10	31.75	31.95	84.22	87.84	7.4	7.7	1	0	205.0	422.5	205.0	570.0	4.0	14.0
98	11	11/05/98	LF, LJ	JM, CH	8.00	8.00	8.70	8.60	30.35	30.90	89.24	88.55	7.8	7.7	1	0	240.0	422.5	240.0	585.0	3.5	10.0
99	11	04/29/99	CH, AS	CH, AS	8.00	8.00	9.90	10.40	29.15	29.25	100.72	107.08	7.6	7.8	1	0	275.0	405.0	275.0	510.0	8.5	12.5
99	11	05/17/99	CH, AS	CH, BP	11.00	11.00	9.80	9.70	30.20	29.55	107.34	105.78	7.8	7.7	4	1	175.0	500.0	175.0	500.0	11.0	17.5
99	11	07/13/99	CH, AS	CH, AS	16.00	16.50	8.80	8.30	30.80	31.10	107.29	102.39	7.6	7.6	0	0	200.0	460.0	200.0	525.0	17.0	26.0
99	11	08/12/99	AS, CH	AS, CH	14.50	15.50	8.10	8.50	31.10	31.85	96.01	103.30	7.7	7.6	0	0	230.0	430.0	230.0	560.0	19.0	23.0
99	11	09/13/99	AS, CH	TS, AS	15.50	17.00	7.90	7.30	31.90	32.00	96.04	91.47	*	*	8	6	270.0	390.0	270.0	520.0	16.5	23.5
99	11	10/12/99	AS, BP	AS, TS	11.00	12.00	7.50	7.80	30.85	31.15	82.50	87.83	7.6	7.7	3	3	300.0	495.0	300.0	510.0	7.0	9.0
99	11	11/09/99	AS, CH	CH, JH	7.00	7.50	8.10	8.30	30.15	30.25	81.09	84.10	7.8	7.8	7	4	209.0	395.0	209.0	570.0	2.0	7.0
00	11	04/19/00	AS, TJ, JW, SC	AS, SC, TJ, JW	6.50	5.50	10.70	10.75	30.10	30.65	105.82	104.23	7.8	*	2	0	170.0	220.0	210.0	510.0	5.5	6.0
00	11	05/18/00	TJ, AS, JW	JW, TJ	11.00	11.00	9.25	9.15	28.40	27.80	100.11	98.63	7.8	*	2	2	217.5	255.0	220.0	260.0	13.0	18.0
00	11	06/19/00	JW, BI, TJ	JW, BI, TJ	14.00	14.00	8.10	8.20	28.90	28.20	93.70	94.43	7.7	7.7	3	2	245.0	392.0	245.0	550.0	18.0	20.0
00	11	07/17/00	JW, TJ	JW, BI, TJ	16.00	18.00	8.20	8.40	31.30	30.80	100.30	106.48	7.8	*	3	2	265.0	365.0	265.0	520.0	16.0	20.0
00	11	08/15/00	JW, TJ	TJ, JW	18.00	18.50	9.10	7.00	29.90	30.10	114.70	89.18	7.8	*	5	0	275.0	430.0	275.0	500.0	18.0	21.0
00	11	09/14/00	JW, TJ	TJ, JW	15.00	15.00	7.05	8.00	31.70	31.10	84.75	95.80	8.1	*	3	2	260.0	415.0	260.0	530.0	13.0	18.0
00	11	10/16/00	JW	JW	10.00	10.00	7.50	8.10	30.00	31.30	80.26	87.45	6.7	7.7	0	1	245.0	330.0	245.0	540.0	6.0	3.0
00	11	11/13/00	TJ	JW	3.50	10.00	8.30	7.60	29.45	29.40	76.01	81.01	7.9	7.5	3	3	240.0	340.0	240.0	570.0	3.5	5.7
01	11	04/24/01	CM, TJ	BI, TJ	7.50	8.50	10.40	10.20	27.10	18.35	103.14	97.78	7.9	7.9	2	0	233.0	390.0	233.0	510.0	7.0	13.0
01	11	05/23/01	TJ, CM	BI, TJ	11.00	12.00	8.70	8.90	30.20	29.88	95.29	99.38	7.9	7.7	0	1	225.0	410.0	225.0	520.0	10.0	14.5
01	11	06/21/01	TJ	TJ	16.00	16.00	8.40	8.50	27.40	28.85	100.23	102.35	7.8	7.9	2	1	245.0	258.0	245.0	455.0	14.0	16.5
01	11	07/23/01	TJ	BI	15.00	16.50	8.50	10.60	30.50	30.30	101.39	130.09	7.9	8.3	0	0	185.0	362.5	185.0	525.0	20.0	21.0
01	11	08/20/01	TJ, ADS	TJ, AD	15.00	17.00	7.80	7.85	33.10	32.90	94.63	98.93	*	*	0	24	180.0	373.0	180.0	545.0	18.0	22.0
01	11	09/18/01	TJ, ADS	AS, TJ	13.50	15.00	7.60	7.10	32.90	32.90	89.32	86.03	7.8	7.9	0	0	193.0	230.0	193.0	560.0	11.0	21.0
01	11	10/17/01	TJ, ADS	AD, TJ	12.00	12.50	8.30	8.20	31.55	32.55	93.71	94.18	7.8	7.8	7	0	220.0	365.0	220.0	570.0	13.0	13.0
01	11	11/01/01	AD, CD	AD	9.00	9.50	8.70	8.00	31.65	31.95	92.10	85.80	7.8	NA	5	1	280.0	410.0	280.0	515.0	12.0	11.0

Site 12 - Sewage Treatment Plant

YEAR	SITE	DATE	SAMPLER-L	SAMPLER-H	WTMP-L	WTMP-H	DO-L	DO-H	SAL-L	SAL-H	SAT-L	SAT-H	pH-L	pH-H	FECAL-L	FECAL-H	LP-L	LP-H	DEPTH-L	DEPTH-H	ATEMP-L	ATEMP-H
					°C	°C	PPM	PPM	PPM	PPM	%	%			CFU/100ML	CFU/100ML	cm	cm	cm	cm	°C	°C
01	12	09/18/01	DB, NH	DB, LA	21.0	21.0	6.3	8.7	0.0	17.3	71.0	107.7	7.2	7.4	1	0	Outflow Pipe	67.5	Outflow Pipe	100.0	11.0	24.0
01	12	10/17/01	DL, DB	DL, DB	18.0	13.0	6.0	9.2	0.3	2.1	63.8	88.7	7.1	6.7	1	12	Outflow Pipe	100.0	Outflow Pipe	100.0	11.0	12.0
01	12	11/01/01	DL, DB	DL	13.0	10.0	6.6	10.4	0.0	1.9	62.9	93.6	6.9	7.1	4	14	Outflow Pipe	100.0	Outflow Pipe	100.0	7.0	13.0

Site 13 - Marina Falls Landing

0.0

YEAR	SITE	DATE	SAMPLER-L	SAMPLER-H	WTMP-L	WTMP-H	DO-L	DO-H	SAL-L	SAL-H	SAT-L	SAT-H	pH-L	pH-H	FECAL-L	FECAL-H	LP-L	LP-H	DEPTH-L	DEPTH-H	ATEMP-L	ATEMP-H
					°C	°C	ppm	ppm	ppt	ppt	%	%			CFU/100ML	CFU/100ML	cm	cm			°C	°C
01	13	10/7/01	PS, DG	PS, DG, MG	13.5	14.0	9.1	9.2	3.6	2.3	89.5	90.8	7.3	7.3	20	20	120.0	130.0	130.0	365.0	12.0	13.0
01	13	11/01/01	MY	PS, RP	7.0	9.5	10.3	10.9	2.8	1.2	90.9	96.5	6.9	7.1	44	30	30.0	150.0	30.0	160.0	9.0	13.0

SITE 14 - Fowler's Dock

YEAR	SITE	DATE	SAMPLER-L	SAMPLER-H	WTEMP-L	WTEMP-H	DO-L	DO-H	SAL-L	SAL-H	SAT-L	SAT-H	pH-L	pH-H	FECAL-L	FECAL-H	EP-L	EP-R	DEPTH-L	DEPTH-H	ATEMP-L	ATEMP-H
					°C	°C	ppm	ppm	ppt	ppt	%	%			CFU/100ML	CFU/100ML	cm	cm	cm	cm	°C	°C
01	14	10/17/01	L.A, SP, SP	L.A, AF	14.0	14.0	7.80	8.10	0.40	0.80	76.2	79.4	7.1	6.8	12	6	175.0	138.0	390.0	385.0	14.5	13.5
01	14	11/02/01	AF, RP	PS, RP	8.5	10.0	9.25	10.00	0.93	0.00	79.9	89.0	7.0	6.9	10	8	157.5	165.0	385.0	385.0	8.5	15.0

Site 16 - Exeter

YEAR	SITE	DATE	SAMPLER-L	SAMPLER-H	WTMPH-L	WTMPH-H	DO-L	DO-H	SAL-L	SAL-H	SAT-L	SAT-H	pH-L	pH-H	FECAL-L	FECAL-H	LP-L	LP-H	DEPTH-L	DEPTH-H	ATEMP-L	ATEMP-H
					°C	°C	ppm	ppm	ppt	ppt	%	%			CRU/100ML	CRU/100ML	cm	cm	cm	cm	°C	°C
98	16	05/12/98	JR, AD, ED	CM	11.0	13.0	9.9	8.9	0.60	1.40	90.5	85.5	6.8	7.8	150	280	75.0	98.0	110.0	292.0	14.0	13.0
98	16	06/10/98	JJ	CO	19.0	22.0	8.1	8.2	0.40	1.40	87.9	94.9	7.1	7.5	150	60	70.0	95.0	70.0	270.0	23.5	26.0
98	16	07/09/98	JR, ED, AD	ED, AD, JR	22.0	25.5	8.3	7.5	0.30	0.50	95.5	92.2	7.6	7.8	110	60	56.0	102.5	56.0	260.0	24.0	26.5
98	16	08/10/98	JR, AD	JR, AD	21.0	29.5	8.0	13.8	3.10	8.40	102.4	189.5	7.0	7.2	300	130	20.0	35.0	20.0	265.0	29.0	35.0
98	16	09/09/98	CM	JR, ED	20.0	21.0	9.6	9.1	2.95	7.40	107.7	106.6	7.8	7.9	100	100	45.0	52.5	45.0	300.0	18.0	14.0
98	16	10/07/98	JR, ED	CO	11.0	4	9.7	14.6	5.70	*	91.3	#VALUE!	7.4	*	10	10	5.0	32.5	5.0	355.0	9.0	16.0
98	16	11/05/98	JR, ED	JR, ED	7.0	8.0	10.2	10.5	0.20	0.00	84.6	89.1	7.2	7.4	20	0	20.0	52.0	20.0	300.0	2.0	8.0
99	16	04/29/99	SO, JS	SO, JS	11.0	14.0	*	4.7	0.60	0.40	#VALUE!	45.92	*	*	0	0	70.0	105.0	70.0	320.0	11.0	15.0
99	16	05/17/99	*	SO	21.0	*	4.1	*	1.60	*	46.57	*	*	*	0	0	*	42.5	*	270.0	*	21.0
99	16	06/15/99	JS, CD	CSO, JSS	24.0	27.0	9.1	5.8	16.90	7.40	118.75	75.88	7.6	8.6	150	160	23.5	32.5	90.0	337.0	24.0	26.0
99	16	07/13/99	JS, NH	JS, NH	23.5	22.0	3.5	6.8	12.55	12.40	44.19	83.43	7.1	7.4	0	100	45.0	46.5	100.0	320.0	19.5	22.0
99	16	08/12/99	NH, CD	CD, NH	22.0	27.0	6.4	12.7	15.25	16.60	79.77	174.47	7.2	8.4	660	170	36.5	30.0	88.0	315.0	22.5	28.5
99	16	09/13/99	NH, JS	NH, JS	22.0	22.0	7.9	7.8	2.10	1.40	91.72	90.23	7.3	7.6	340	200	64.5	84.0	86.0	314.0	24.0	22.0
99	16	10/12/99	AR, PM	NH	11.5	13.0	10.8	10.3	0.70	0.70	99.93	98.59	7.3	7.5	100	500	60.0	107.5	60.0	280.0	13.0	14.0
99	16	10/29/99	NH	NH, JS	6.0	6.5	11.6	11.4	0.20	0.90	93.80	93.71	7.1	7.0	100	90	95.0	255.0	95.0	390.0	3.0	10.5
00	16	04/19/00	JS, NH	JS, NH	10.50	10.00	11.20	11.15	1.15	1.15	101.53	99.91	7.00	7.20	70	10	105.00	175.00	105.00	325.00	7.00	7.50
00	16	05/18/00	JS, NH	JS, NH	17.00	17.50	9.20	9.20	1.50	0.95	96.38	97.09	7.40	7.20	30	50	85.00	95.00	85.00	245.00	20.00	23.00
00	16	06/19/00	JS, IL	JS, IL	23.00	22.50	8.40	8.00	1.60	2.00	99.14	93.72	7.30	7.50	220	130	90.00	97.50	90.00	280.00	22.50	24.00
00	16	07/17/00	JS, IL	JS, IL	20.50	21.50	8.00	7.60	1.65	0.20	90.01	86.53	7.00	7.10	600	120	68.50	107.50	111.00	305.00	17.00	23.00
00	16	08/15/00	JS, NA	JS, NA	21.50	23.50	7.75	8.10	1.10	1.40	88.65	96.40	7.10	7.30	320	190	95.00	116.00	110.00	307.00	19.50	22.00
00	16	09/14/00	IL, NH	NH, VT	19.50	22.00	12.80	12.00	4.10	8.50	143.05	144.13	8.40	8.20	190	0	62.50	72.50	95.00	310.00	17.50	24.00
00	16	10/16/00	IL, NH, JS	JS, IL	10.00	8.50	9.80	9.80	1.80	0.80	88.14	84.56	7.00	7.30	700	400	97.00	110.00	97.00	390.00	8.00	11.00
00	16	11/13/00	JS, IL	JS, VT, NH	8.00	8.50	10.90	11.00	0.90	1.05	92.99	95.05	7.40	7.30	200	600	82.50	77.50	105.00	355.00	8.00	9.50
01	16	04/24/01	JS, NA, VT	JS, NA, VT	15.0	18.0	8.9	8.5	0.20	0.60	88.76	90.47	6.9	7.3	40	40	120.0	142.5	120.0	320.0	20.0	34.0
01	16	05/23/01	JS, EL	JS, VT	15.0	18.5	9.0	9.0	0.00	0.50	89.66	96.71	7.3	7.1	800	190	80.0	70.0	95.0	315.0	13.0	17.5
01	16	06/21/01	JS, IL	JS, IL	23.0	22.0	7.1	7.5	0.30	1.95	83.24	87.01	7.2	7.1	50	60	96.0	96.0	100.0	300.0	20.5	12.0
01	16	07/23/01	EL, NA, VT	EL, NA, VT	25.0	27.5	8.2	11.0	1.20	1.10	100.24	140.59	7.6	8.6			65.0	47.0	70.0	222.0	28.5	36.0
01	16	08/20/01	EL, VT	EL, VT	24.0	25.0	5.3	9.2	8.70	9.20	66.14	117.24	7.0	7.7	1400	370	50.0	37.5	100.0	335.0	26.5	27.0
01	16	09/18/01	JS, VT	JS, IL	18.0	20.0	9.2	13.3	3.95	17.75	99.69	161.92	7.5	8.0	>6000	1100	30.0	37.5	95.0	340.0	14.0	24.5
01	16	10/17/01	VT, EL	VT, NA	14.0	15.0	8.8	11.0	0.40	1.00	83.97	110.19	7.4	7.7	100	420	60.0	80.0	100.0	345.0	13.5	12.0
01	16	11/01/01	JS, NA	NA, NH	7.0	11.0	10.1	13.4	6.75	9.65	87.00	129.04	6.9	7.0	700	900	48.0	42.5	87.0	310.0	9.0	16.0

Site 17 - Dover Foot Bridge

YEAR	SITE	DATE	SAMPLER-L	SAMPLER-H	WTEMP-L	WTEMP-H	DO-L	DO-H	SAL-L	SAL-H	SAT-L	SAT-H	pH-L	pH-H	FECAL-L	FECAL-H	LP-L	LP-H	DEPTH-L	DEPTH-H	ATEMP-L	ATEMP-H
					oC	oC	ppm	ppm	ppt	ppt	%	%			CFU/100ML	CFU/100ML	cm	cm	cm	cm	oC	oC
01	17	10/17/01	RH, AF, LS	AF, RH, LS	13.0	14.0	9.90	9.10	0.70	0.80	94.77	89.10	6.9	7.0	160	0	100	225	100	565	10	13
01	17	11/01/01	AF, LKS, PS	AM, LS	8.0	19.5	11.10	10.90	0.20	2.00	94.32	120.46	7.1	7.1	90	110	70	160	70	160	6	11

Site 19 - Bartlett Ave.

YEAR	SITE	DATE	SAMPLER-L	SAMPLER-H	WTEMP-L	WTEMP-H	DO-L	DO-H	SAL-L	SAL-H	SAT-L	SAT-H	pH-L	pH-H	FECAL-L	FECAL-H	FCAL-H	LP-L	LP-H	DEPTH-L	DEPTH-H	ATEMP-L	ATEMP-H
OC		OC			OC	OC	ppm	ppm	psu	psu	%	%			CFU/100ML	CFU/100ML	CFU/100ML	cm	cm	cm	cm	OC	OC
97	19	04/23/97	NJ, AS, TM, SM	NJ, AS	8.0	11.0	10.40	10.60	1.10	12.70	88.82	103.94	7.4	7.5	22	10	22.0	83.0	22.0	83.0	12	14	
97	19	05/06/97	AS, NJ	AS	9.0	10.0	9.50	11.20	2.00	2.60	83.54	101.19	7.5	7.6	50	10	17.0	88.0	17.0	88.0	10	11	
97	19	05/22/97	NJ, AS, KD	AS, KD	11.0	14.0	9.40	11.80	1.90	7.90	86.58	120.20	7.2	7.6	*	*	25.0	60.0	25.0	60.0	12	18	
97	19	06/05/97	CJ, KD, NJ	CJ, KD, NJ	13.0	15.0	7.90	9.00	0.30	1.50	75.45	90.40	7.8	6.9	170	100	20.0	75.0	20.0	75.0	11	17	
97	19	06/23/97	NJ, BJ	NJ, BJ	20.5	23.0	7.70	7.30	1.10	2.20	86.38	86.43	8.0	7.9	450	370	12.5	78.0	12.5	78.0	23	27.5	
97	19	07/07/97	EH, ML	EH, ML	18.0	24.0	8.80	10.80	2.10	13.32	94.41	138.32	7.8	8.2	760	210	10.0	55.0	10.0	55.0	19	20	
97	19	07/21/97	NJ, KD	NJ, KD	18.0	19.0	8.00	9.10	9.60	25.60	89.42	113.85	7.7	8.1	510	280	10.0	75.0	10.0	75.0	19	20	
97	19	08/04/97	NJ, KD	NJ, KD	19.0	21.0	8.40	8.90	1.80	2.00	91.82	101.31	7.8	7.8	TNTC	*	10.0	65.0	10.0	65.0	15	26	
97	19	08/19/97	AS, KD	AS, KD	16.0	21.0	8.60	9.80	1.50	17.95	88.23	121.73	7.1	7.6	TNTC	200	5.0	72.5	5.0	95.0	15	26	
97	19	09/03/97	AS, KD	AS, KD, NJ	19.0	19.0	8.90	9.10	1.35	13.00	97.05	105.76	8.1	7.6	510	30	10.0	65.0	10.0	65.0	21	21	
97	19	09/18/97	AS, SK	AS	16.0	19.0	8.80	8.90	2.20	7.60	90.63	100.37	7.6	7.8	*	*	10.0	110.0	10.0	110.0	18	28	
97	19	10/02/97	NJ, KD, AS	KD	9.0	12.0	10.60	10.70	1.60	22.00	93.00	113.56	7.5	7.8	220	0	5.0	60.0	5.0	60.0	4	16	
97	19	10/17/97	KD, NJ, AS	AR, JC	10.0	12.0	9.90	9.10	1.80	28.10	89.04	100.43	INVALID	7.8	1030	20	10.0	125.0	15.0	125.0	5	16.5	
97	19	11/03/97		SM, TM	11.0	11.5	8.30	8.50	1.15	1.48	76.12	78.99	7.1	7.1	*	*	25.0	90.0	25.0	90.0	8	14.5	
98	19	03/12/98	AS, NJ	AS, NJ	15.0	14.0	9.30	10.40	0.85	0.80	#VALUE!	101.83	7.3	7.5	440	300	29.0	55.0	29.0	55.0	9	14	
98	19	06/10/98	NJ, AS	AS	16.0	19.0	8.00	8.10	0.85	3.60	81.79	89.39	7.6	7.8	300	140	10.0	50.0	10.0	50.0	17	19	
98	19	07/09/98	AS, NJ	NJ, ML	17.0	21.5	8.20	8.30	1.25	3.40	83.79	96.09	7.8	7.8	100	30	8.0	67.0	8.0	67.0	18	25.5	
98	19	08/10/98	ML, NJ	ML, NJ	22.0	24.0	9.00	8.80	0.10	12.55	103.42	112.12	8.1	7.0	50	10	5.0	73.0	5.0	73.0	25	30	
98	19	09/09/98	ML, RD, AS	AS, ML, RB	17.0	18.0	9.05	8.70	2.20	5.50	95.17	95.07	7.8	7.8	250	240	5.0	120.0	5.0	120.0	18	18	
98	19	10/07/98	AS, ML	CH, JM	8.0	12.0	10.90	9.90	1.70	23.55	93.41	101.82	7.6	7.8	0	0	5.0	105.0	5.0	105.0	5	16	
98	19	11/05/98	NJ, AS	ML, AS	4.0	6.5	11.50	10.70	1.60	11.90	89.05	93.93	8.0	7.9	0	100	40.0	10.0	40.0	10.0	3	12	
98	19	11/12/98	AS, NJ	ML, AS	6.0	7.0	9.80	11.00	2.90	6.15	80.50	94.42	7.5	7.5	0	300	40.0	10.0	40.0	10.0	2	10.5	
99	19	04/29/99	ML, AS	ML, AS	8.0	13.0	10.40	11.40	1.40	2.20	88.98	110.03	7.9	8.4	100	300	12.0	73.0	12.0	73.0	9.0	14.0	
99	19	05/17/99	ML, AS	ML, AS	13.0	17.5	9.70	11.90	1.63	2.25	93.33	126.46	7.7	8.3	0	300	6.0	80.0	6.0	80.0	13.0	19.0	
99	19	06/15/99	ML, AS	AS, ML	21.0	23.0	8.10	10.20	1.75	9.80	92.08	125.71	8.1	7.9	1380	200	8.0	80.0	8.0	80.0	21.0	27.0	
99	19	07/13/99	NJ, AS	NJ, BJ	18.5	17.5	8.30	6.60	0.30	26.15	89.09	80.48	7.0	*	6600	480	15.0	85.0	15.0	85.0	17.0	20.0	
99	19	08/12/99	ML, NJ	AS, NJ	18.0	21.0	7.60	7.90	0.30	15.70	80.76	96.88	7.7	7.9	3800	480	15.0	85.0	15.0	85.0	19.0	28.0	
99	19	09/13/99	ML, AS	AS, NJ	17.5	20.0	9.60	8.20	1.35	14.30	101.53	97.88	7.9	8.0	80	200	7.0	73.0	7.0	73.0	20.0	22.0	
99	19	10/12/99	AS, ML	AS, MB	10.0	12.5	10.00	10.70	0.90	11.30	89.48	107.57	8.0	8.1	4	3	10.0	60.0	10.0	60.0	10.0	15.0	
99	19	11/09/99	NJ, MJ	ML, AS, PA, RL	5.0	6.0	8.00	12.40	3.50	2.85	63.54	101.82	8.1	7.8	860	6600	5.0	80.0	5.0	80.0	3.0	11.0	
00	19	04/19/00	ASB, MLR	ASB, MLR	7.0	8.0	11.80	11.90	1.20	1.90	98.39	102.10	7.6	7.7	1800	1500	14.0	75.0	14.0	75.0	5.00	7.00	
00	19	05/18/00	AS, ML	AS, ML, BG	14.0	16.0	9.00	10.60	0.90	2.25	88.17	109.20	7.6	7.5	1800	1500	10.0	65.0	10.0	65.0	15.00	23.00	
00	19	06/19/00	AS, ML	AS	18.0	19.0	9.30	8.90	1.60	2.10	99.51	97.44	7.5	7.6	3200	1000	18.0	55.0	18.0	55.0	16.00	25.00	
00	19	07/17/00	AS, ML	AS, ML	17.0	17.5	8.10	8.00	0.85	0.90	84.57	84.40	7.1	7.3	900	800	18.0	55.0	18.0	55.0	18.00	23.00	
00	19	08/15/00	AS, ML	AS, ML	18.0	20.0	7.40	7.40	0.30	2.10	78.64	82.65	7.3	7.8	2100	900	15.0	65.0	15.0	65.0	18.00	21.00	
00	19	09/14/00	AS, ML	AS, ML, NFS ^{ers}	17.0	19.0	7.90	7.90	1.20	4.10	82.63	87.42	7.5	7.6	390	270	7.0	70.0	7.0	70.0	13.00	23.00	
00	19	10/16/00	CH, BT	AS, ML	11.0	10.0	9.50	8.60	0.30	14.70	86.72	83.44	7.6	7.6	30	600	8.0	65.0	8.0	65.0	6.00	11.00	
00	19	11/13/00	ML, AS	ML, AS	7.0	8.5	10.00	10.30	1.10	1.25	83.34	90.83	7.3	7.4	70	70	12.0	115.0	12.0	115.0	5.00	6.00	
01	19	04/24/01	ML, AS, SM	AS, CR	13.0	18.0	10.40	9.80	1.55	1.90	100.02	105.03	7.5	7.9	10	130	10.0	80.0	10.0	80.0	14	25	
01	19	05/23/01								0.00				130	60	10.0	55.0	10.0	55.0	17	19		
01	19	06/21/01	AS, ML	AS, ML	20.0	20.0	6.60	7.50	1.45	2.10	73.46	83.76	7.3	7.3	190	180	7.0	50.0	7.0	50.0	24.5	33	
01	19	07/23/01	ML, JB	AS	22.5	25.5	8.50	9.90	0.85	14.50	98.98	130.96	7.9	7.9	190	500	5.0	100.0	5.0	100.0	21	24	
01	19	08/20/01	ML, NC	ML, NC	21.0	22.0	9.40	8.00	2.40	10.60	107.22	97.19	7.8	7.7	270	500	7.0	100.0	7.0	100.0	13	24.5	
01	19	09/18/01	AS, ML	ML, AS, JM, CB, DZ	14.0	17.0	10.40	9.80	0.75	21.40	101.80	119.27	7.7	8.0	60	2800	5.0	100.0	5.0	100.0	14	15	
01	19	10/17/01	ML, AS	ML, AS, BH, BA, JL	13.0	13.0	8.20	9.30	0.35	0.38	78.34	88.86	7.2	7.2	180	10	20.0	35.5	20.0	118.0	14	15	
01	19	11/01/01	ML, SM	ML, MS	8.0	10.0	11.20	9.80	0.90	10.05	95.55	92.46	7.4	7.9	110	500	0.8	70.0	0.8	70.0	8	13	

Site 20 - Junkins Ave.

YEAR	SITE	DATE	SAMPLER-I	SAMPLER-H	WTEMP-L	WTEMP-H	DO-L	DO-H	SAL-L	SAL-H	SAT-L	SAT-H	pH-L	pH-H	FECAL-L	FECAL-H	LP-L	LP-H	DEPTH-L	DEPTH-H	ATEMP-L	ATEMP-H
					oC	oC	ppm	ppm	ppt	ppt	%	%			CFU/100ML	CFU/100ML	cm	cm	cm	cm	oC	oC
97	20	04/23/97	DR, ML	JR, BR	9.0	16.0	3.30	1.30	15.30	5.10	31.40	13.60	7.3	6.9	TNTC	TNTC	35.0	30.0	35.0	30.0	9.0	16.0
97	20	05/06/97	ML, DR	JR, DR	11.0	12.0	7.60	7.17	24.40	25.30	80.13	77.71	7.4	7.6	0	0	25.0	40.0	25.0	40.0	10.0	10.0
97	20	05/22/97	ML, DR	JR, DR	12.0	16.0	6.60	8.70	24.40	25.10	71.12	102.33	7.4	7.8	30	10	30.0	25.0	30.0	25.0	10.0	16.0
97	20	06/03/97	EH, DR	JR, DR	15.0	17.0	8.20	9.30	2.15	28.55	82.65	114.00	7.1	7.8	10	10	33.0	45.0	33.0	45.0	11.0	15.0
97	20	06/23/97	ML, EH	DR, SM	21.0	22.0	4.40	8.30	29.50	29.60	58.52	112.48	7.6	7.8	10	0	35.0	20.0	35.0	20.0	23.0	27.0
97	20	07/07/97	EH, ML	DR, JR	22.5	27.0	4.80	6.10	30.80	31.50	66.11	91.20	7.4	7.7	0	0	25.0	15.0	25.0	15.0	23.0	26.0
97	20	07/21/97	EH, ML	EH	21.0	21.0	7.20	8.30	20.00	27.90	94.89	109.32	8.0	8.1	250	180	35.0	32.0	35.0	32.0	19.0	20.0
97	20	08/04/97	ML, EH	JR, DR	23.0	25.0	4.40	7.20	29.10	30.90	60.52	103.68	7.4	7.7	TNTC	*	30.0	27.0	30.0	27.0	18.0	21.0
97	20	08/19/97	JR, DR	JR, DR	21.0	21.0	5.30	9.30	30.20	30.80	70.79	124.68	7.6	7.8	0	0	25.0	50.0	25.0	50.0	17.0	22.0
97	20	09/03/97	DR, ML	DR, JR	23.0	23.0	4.20	5.30	28.50	29.75	56.54	75.95	7.4	7.6	0	0	30.0	30.0	30.0	30.0	20.5	20.0
97	20	09/18/97	ML, DR	DR, JR	17.0	21.0	6.00	7.30	31.20	32.80	74.79	99.09	7.5	7.6	*	*	35.0	60.0	35.0	60.0	17.0	20.0
97	20	10/17/97	ML, DR	DR	11.0	14.0	6.10	7.90	31.60	31.90	63.11	90.34	7.4	7.8	0	0	0.0	25.0	0.0	25.0	5.0	15.0
97	20	11/03/97	FH, ML	JR, DR	10.0	15.0	7.30	7.60	11.35	23.00	69.41	86.46	7.6	7.4	*	*	30.0	40.0	30.0	40.0	8.0	17.0
98	20	05/12/98	DR, EH	DR, EH, CH	9.0	14.0	8.30	8.50	14.05	16.50	78.38	91.04	7.2	7.4	TNTC	996	30.0	30.0	30.0	30.0	11.0	13.0
98	20	06/10/98	DR, EH	BH, DR	18.0	22.0	9.20	9.30	28.50	29.70	114.95	126.11	7.8	8.0	0	0	22.0	20.0	22.0	20.0	17.0	24.0
98	20	07/09/98	DR, EH	DR, ML	22.0	26.0	2.40	6.10	23.65	22.90	31.39	83.30	7.4	7.8	20	0	17.0	25.0	17.0	25.0	25.0	25.0
98	20	08/10/98	DR, ML	DR	25.0	28.0	3.90	7.90	29.60	30.25	84.30	119.22	7.6	7.6	0	0	25.0	25.0	25.0	25.0	24.5	29.0
98	20	09/09/98	JR, DR	JR, DR	16.0	18.5	5.90	7.40	30.30	22.90	71.71	90.20	7.7	7.9	40	0	15.0	50.0	15.0	50.0	9.0	15.0
98	20	10/07/98	EH, DR	DR, EH	9.0	12.0	8.00	8.80	30.90	32.10	84.25	99.73	7.6	7.9	0	0	25.0	45.0	25.0	45.0	2.0	10.0
98	20	11/05/98	DR, EH	DR	7.0	8.0	9.60	9.60	28.90	29.15	95.28	97.67	7.7	7.6	0	0	20.0	26.0	25.0	26.0	9.5	13.0
99	20	04/23/99	ML, KH	KK, DR	11.0	13.0	7.00	7.90	27.80	29.15	75.46	89.66	7.9	7.8	0	0	20.0	35.0	20.0	35.0	15.0	17.0
99	20	05/17/99	KK, PW, JR	KK, DR, EH	16.5	20.0	5.90	6.80	28.85	28.95	71.75	88.49	7.6	7.7	0	0	20.0	25.0	20.0	25.0	15.0	20.0
99	20	06/13/99	KK, ML	DR, EH	19.0	22.0	4.70	8.90	30.50	29.90	60.61	120.83	7.6	7.8	0	0	20.0	25.0	20.0	25.0	23.0	26.0
99	20	07/13/99	KP, RL	KP, SM	16.5	17.0	4.00	7.10	31.50	31.10	44.37	88.45	7.4	7.6	10	10	10.0	28.0	10.0	28.0	17.0	19.0
99	20	08/12/99	RL, KP	SM, KP	18.0	20.5	3.50	7.00	30.80	32.90	44.37	94.21	7.6	7.8	70	30	10.0	25.0	10.0	25.0	21.0	26.0
99	20	09/13/99	RL, KH	RL, KH	18.5	24.5	11.40	*	27.45	14.65	142.86	*	8.5	8.8	50	200	10.0	25.0	10.0	25.0	20.0	22.0
99	20	10/12/99	KH, AH	KH	14.0	14.0	7.60	8.50	28.85	28.85	87.89	98.30	7.8	8.0	0	0	10.0	25.0	10.0	25.0	10.0	14.0
99	20	11/09/99	RL, KH	KH	4.5	6.0	8.80	10.30	28.00	28.90	81.76	101.79	6.5	8.0	10	0	10.0	25.0	10.0	25.0	1.5	8.0
00	20	04/19/00	KH, KP	KH	7.0	8.0	5.90	10.30	24.80	26.75	56.95	103.10	7.0	8.0	50	0	10.0	10.0	10.0	10.0	5.0	7.0
00	20	05/18/00	KH	KH	16.5	19.0	12.90	10.80	23.80	25.25	152.01	134.83	8.4	8.3	100	210	10.0	40.0	10.0	40.0	10.0	15.0
00	20	06/19/00	KH	KH, KP	23.0	26.0	7.70	7.20	26.10	26.60	104.04	102.84	7.6	7.6	800	0	10.0	25.0	10.0	25.0	16.0	26.0
00	20	07/17/00	RL, SM	RL, SM	21.0	21.0	6.00	8.60	10.50	10.50	67.40	102.46	7.1	7.4	0	0	600	10.0	25.0	10.0	16.0	20.0
00	20	08/15/00	KH, KP	KH, KP	22.0	20.0	2.80	5.20	28.30	25.60	37.65	66.30	6.6	7.1	110	0	10.0	25.0	10.0	25.0	13.5	20.0
00	20	09/14/00	KH, RL	KH	16.0	25.0	4.70	8.60	30.10	31.50	57.05	124.29	6.9	7.7	0	0	10.0	25.0	10.0	25.0	23.0	19.5
00	20	10/16/00	RL, SM	KP, AH	13.0	14.0	6.50	8.70	31.30	19.65	74.92	94.97	7.4	7.5	10	20	10.0	40.0	10.0	40.0	8.0	6.0
00	20	11/13/00	KH	KH	7.0	10.0	8.10	6.40	11.85	17.50	71.96	63.17	7.1	7.1	600	600	100.0	40.0	100.0	40.0	6.0	6.0
01	20	04/24/01	KH	RL, KP	17.0	19.5	4.10	5.10	23.15	22.10	48.61	63.07	7.4	7.1	20	0	95.0	20.0	95.0	20.0	15.0	10.0
01	20	05/25/01	KH	RL	13.0	19.0	10.00	8.10	28.80	28.30	113.23	103.03	7.4	7.6	*	*	75.0	20.0	75.0	20.0	13.5	16.0
01	20	06/21/01	KH	KP, SM, RL	18.0	19.0	2.90	5.00	25.90	26.90	35.65	63.05	7.1	7.6	0	0	700	22.0	25.0	22.0	19.0	15.0
01	20	07/23/01	KP, RL	RL, SM	23.5	25.0	6.00	7.50	28.90	29.00	83.16	106.78	7.8	7.6	1500	160	33.0	40.0	33.0	40.0	25.0	30.0
01	20	08/20/01	RL, KP	RL, KP	22.0	22.0	5.70	7.40	30.40	30.80	77.62	101.02	7.8	7.8	200	60	30.0	70.0	30.0	70.0	20.5	22.0
01	20	09/18/01	BH, MS	KH	19.0	17.0	8.80	7.20	31.20	31.25	113.97	89.78	7.7	7.8	600	60	65.0	20.0	65.0	20.0	21.0	14.5
01	20	10/17/01	KH	KH	13.0	14.0	6.40	8.60	29.15	28.85	72.63	99.45	7.4	7.8	>600	530	20.0	30.0	20.0	30.0	17.0	12.5
01	20	11/01/01	KH	JH, CH	9.0	10.0	6.40	8.70	30.65	32.05	67.29	94.41	7.6	7.8	30	0	10.0	25.0	10.0	25.0	14.0	12.0

Site 21 - Pleasant Ave.

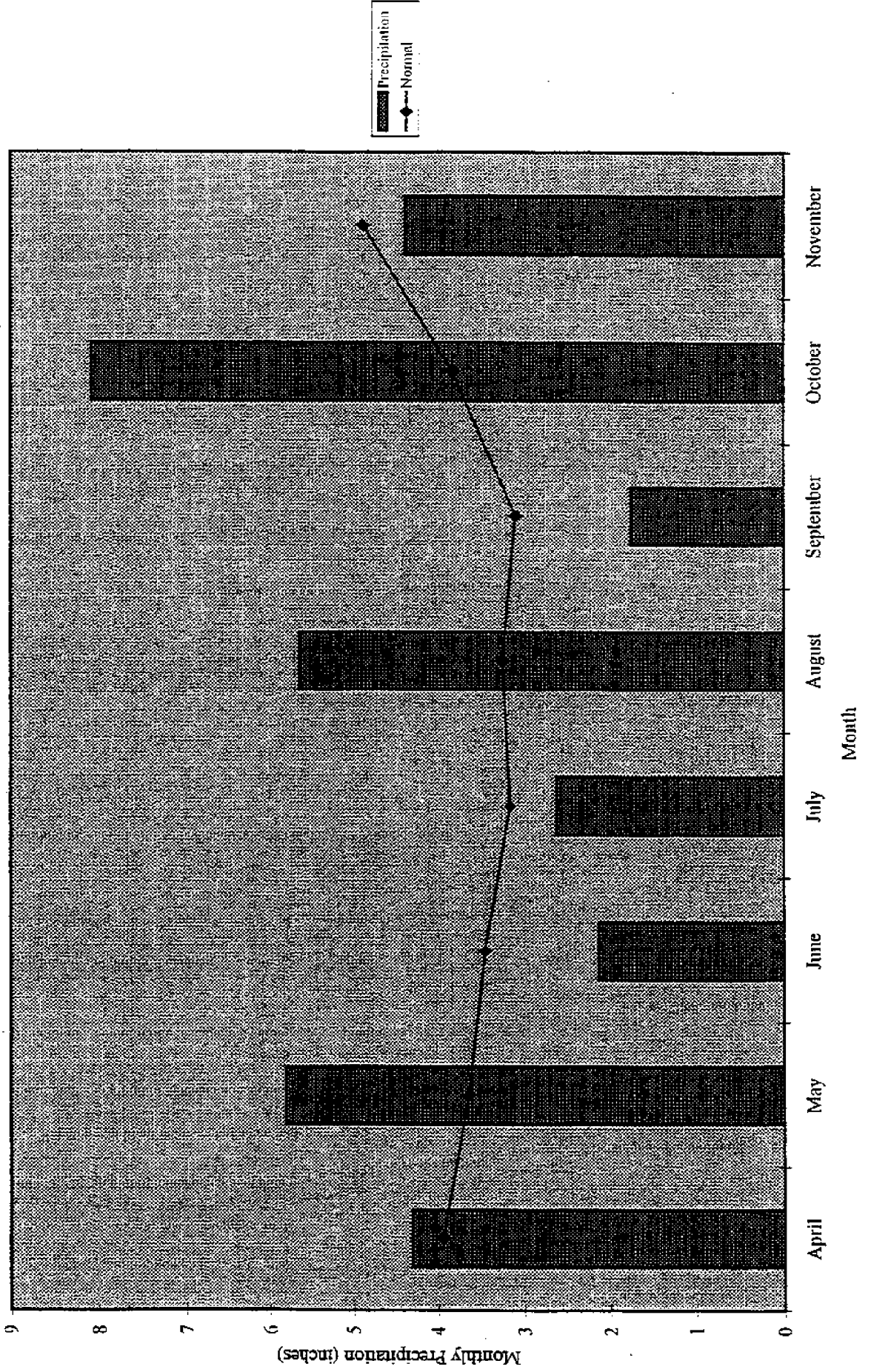
YEAR	SITE	DATE	SAMPLER-L	SAMPLER-H	WTEMP-L	WTEMP-H	DO-L	DO-H	SAL-L	SAL-H	SAT-L	SAT-H	pH-L	pH-H	CFU/100ML	FECAL-L	FECAL-H	LP-L	LP-H	DEPTH-L	DEPTH-H	ATEMP-L	ATEMP-H
°C	°C	ppm	ppm	ppm	ppm	ppt	ppt	%	%	%	%	%						cm	cm	cm	cm	°C	°C
97	21	04/23/97	PW, JR, DT	PW, LH, AN	6.5	15.0	5.90	4.90	4.75	14.20	49.60	52.87	7.2	7.1	40	147.5	172.5	165.0	172.5	165.0	172.5	11.0	16.0
97	21	05/06/97	PW, AN	JR, DR	9.5	9.4	8.80	9.10	23.30	25.80	90.26	92.61	7.6	7.8	0	145.0	190.0	145.0	190.0	145.0	190.0	9.0	10.0
97	21	05/22/97	LH, AN	LW, SM	11.0	12.5	8.40	9.60	23.70	26.30	89.32	105.96	7.7	8.1	10	137.5	137.5	130.0	155.0	130.0	155.0	9.5	15.0
97	21	06/05/97	PW, AN, LH	LH, SM	14.0	14.0	8.60	8.90	28.80	29.35	99.42	103.26	7.9	7.9	0	195.0	160.0	195.0	160.0	190.0	160.0	10.0	16.0
97	21	06/23/97	DR, PW	DR, JR, SM	21.0	16.5	7.10	9.20	30.90	30.60	95.25	113.13	7.8	8.0	10	152.5	190.0	175.0	160.0	190.0	175.0	22.0	34.0
97	21	07/07/97	PW, AN	LH, SM	22.0	23.5	7.80	8.30	31.30	33.50	106.94	118.30	7.7	7.8	0	165.0	163.0	165.0	163.0	163.0	163.0	22.5	29.0
97	21	07/21/97	PW, JK	JR	19.0	17.5	7.70	8.90	30.10	29.20	99.04	110.60	7.9	8.1	0	185.0	155.0	185.0	170.0	170.0	185.0	19.0	19.0
97	21	08/04/97	PW, CH	LH, CH	21.0	20.0	6.30	8.10	31.20	31.30	87.36	107.08	7.6	7.8	6	165.0	157.5	165.0	160.0	160.0	160.0	19.0	21.0
97	21	08/19/97	PW, AN	LH, SM	18.0	16.5	6.65	8.10	31.25	31.45	84.54	100.14	7.8	7.8	90	145.0	170.0	145.0	170.0	170.0	170.0	15.5	25.0
97	21	09/03/97	PW, LH	LH	21.0	21.5	7.80	8.30	30.20	30.92	104.19	112.37	8.0	7.8	0	138.0	168.0	138.0	168.0	168.0	168.0	19.0	21.0
97	21	09/18/97	PW, AN	LH	18.0	18.0	6.80	8.20	31.90	32.20	86.80	104.87	7.6	7.8	0	145.0	220.0	145.0	220.0	145.0	220.0	16.0	27.0
97	21	10/02/97		LH	12.0	12.0	7.90		32.30	0.00	89.77		7.8		0	184.0					184.0	13.5	
97	21	10/17/97	PW, AN	LH	11.0	13.0	7.20	8.70	33.45	32.75	80.61	101.11	7.6	7.8	10	180.0	225.0	180.0	225.0	180.0	225.0	5.0	16.0
97	21	11/03/97	PW, DR	LH	8.5	12.5	8.40	8.30	21.65	26.20	82.24	91.44	7.5	7.8	0	127.5	147.5	185.0	195.0	185.0	195.0	8.5	16.0
98	21	05/12/98	PW, DR	JR, EH	11.0	13.0	8.15	9.20	21.85	21.60	84.54	99.51	7.4	7.5	230	57.5	180.0	170.0	180.0	180.0	180.0	10.0	12.0
98	21	06/10/98	PW, ML	DR, JR	18.0	20.0	6.80	7.70	29.70	29.10	85.60	100.29	7.8	7.6	30	185.0	152.0	185.0	155.0	185.0	155.0	16.5	19.0
98	21	07/09/98	PW	DR, ML	21.0	23.5	6.60	7.30	23.30	24.00	84.37	100.95	8.0	7.7	20	190.0	63.0	190.0	63.0	190.0	63.0	18.0	24.0
98	21	08/10/98	JR	LH	23.0	23.0	8.00	8.40	30.90	30.30	111.25	117.41	7.7	8.0	10	175.0	77.5	180.0	170.0	170.0	24.0	31.0	
98	21	09/09/98	PW, EH	EH, ML	16.0	15.0	7.20	7.80	31.30	31.30	88.07	93.53	7.6	7.5	80	150.0	235.0	150.0	235.0	150.0	235.0	16.0	16.0
98	21	10/07/98	PW, DR	ML, JR	11.0	12.0	8.35	8.80	31.40	31.70	92.19	99.46	7.9	7.7	20	140.0	210.0	140.0	210.0	140.0	210.0	9.0	12.0
98	21	11/03/98	PW, EH	ML, JR	6.0	9.0	9.05	8.90	29.50	30.50	88.10	93.48	7.8	7.4	10	190.0	180.0	190.0	180.0	190.0	180.0	1.0	9.0
99	21	04/29/99																					
99	21	05/17/99																					
99	21	06/13/99																					
99	21	07/13/99	PW, KK	EH, JR	16.5	16.0	4.70	9.60	32.25	31.30	58.41	117.43	7.6	7.4	200	40.5	170.0	40.5	170.0	40.5	170.0	17.0	20.0
99	21	08/12/99	ML, PW	DR, EH	16.0	19.0	6.20	7.80	31.60	32.35	73.98	101.89	7.4	7.3	100	50.0	200.0	50.0	200.0	50.0	200.0	20.5	25.0
99	21	09/13/99	DR, ML	DR, JR	21.0	24.0	13.80	15.30	22.85	27.20	176.36	211.80	7.8	7.7	0	85.0	117.5	140.0	150.0	140.0	150.0	18.0	22.0
99	21	10/12/99	KK, ML	KP, SM	12.0	13.0	7.70	9.00	29.75	30.80	85.90	103.25	7.4	7.4	0	137.0	50.0	137.0	50.0	137.0	50.0	9.0	14.0
99	21	11/09/99	KK, PW	DR	4.0	8.0	8.50	9.50	29.40	28.50	78.79	96.22	7.8	7.5	30	185.0	100.0	185.0	100.0	185.0	100.0	3.5	10.0
00	21	04/19/00	CH, DM, JH, DK	CH, DK, DM	7.0	7.0	8.00	10.90	26.95	28.90	78.35	108.18	7.5	7.7	130	40.0	130.0	40.0	130.0	40.0	130.0	5.0	6.0
00	21	05/18/00	CH, DM, DK	CH, DK, DM	15.0	17.0	8.20	8.20	27.20	26.50	95.77	99.24	7.9	7.7	0	190.0	180.0	190.0	180.0	180.0	180.0	15.0	22.5
00	21	06/19/00	CH, DM, DK	CH, DM	21.0	23.0	6.60	6.30	27.40	28.20	86.67	86.19	7.5	7.5	10	140.0	140.0	140.0	140.0	140.0	140.0	21.0	23.0
00	21	07/17/00	CH, DM, JM	CH, DM, JM	17.5	20.0	8.30	11.60	17.90	23.30	96.31	145.88	7.4	7.9	6000	95.0	95.0	145.0	140.0	140.0	140.0	16.0	19.0
00	21	08/15/00	CH, JH	CH, JH	20.0	21.0	5.70	5.50	29.80	29.50	74.56	73.15	7.5	7.5	0	145.0	150.0	145.0	150.0	145.0	150.0	17.0	22.0
00	21	09/14/00	CH, DM	CH, DK	15.0	17.0	4.80	7.10	31.70	31.80	57.70	88.85	7.4	7.9	4000	20.0	175.0	20.0	175.0	20.0	175.0	14.0	22.0
00	21	10/16/00	DK, DM, CH	DK, DM	12.0	11.0	7.30	8.00	30.40	30.70	81.79	87.92	7.7	7.8	0	175.0	200.0	175.0	200.0	175.0	200.0	7.0	5.0
00	21	11/13/00	CH, DK	CH, DK	8.0	10.0	7.30	8.20	23.80	23.80	72.61	87.40	7.5	7.9	6000	140.0	175.0	140.0	175.0	140.0	175.0	5.0	10.0
01	21	04/24/01	CH, DM, DK	DM, CH, DK	15.5	17.0	7.00	7.70	24.70	24.65	81.29	92.13	7.5	7.8	0	130.0	140.0	130.0	140.0	130.0	140.0	15.0	22.0
01	21	05/23/01	DM, DK	DK, DM	11.5	12.5	7.40	8.90	29.00	29.45	81.27	100.14	7.8	8.0	30	65.0	120.0	65.0	120.0	65.0	120.0	13.0	17.0
01	21	06/21/01	CH, DK	DK, DM	17.0	16.0	6.20	8.00	28.30	28.85	75.88	96.33	7.8	7.9	190	150.0	135.0	150.0	135.0	150.0	135.0	23.5	32.0
01	21	07/23/01	JK, DK	JK, DK	21.0	24.0	6.70	7.20	30.40	30.80	89.60	101.83	7.5	8.0	500	140.0	147.5	140.0	147.5	140.0	147.5	20.0	25.0
01	21	08/20/01	DM, CH	CH, DM	19.0	19.0	7.30	7.60	31.40	31.40	97.26	98.43	7.8	7.9	10	180.0	190.0	180.0	190.0	180.0	190.0	20.0	25.0
01	21	09/18/01	DM, DK	DK, DM	15.0	16.5	7.90	8.30	32.40	32.40	95.41	103.25	7.6	8.0	20	165.0	210.0	165.0	210.0	165.0	210.0	14.0	24.0
01	21	10/17/01	DK, CH	CH, DK	13.5	13.0	6.70	8.50	29.45	32.55	76.98	98.65	7.7	7.8	>600	40.0	185.0	40.0	185.0	40.0	185.0	14.0	14.0
01	21	11/01/01	DK, CH	DK, DM	8.0	10.0	6.60	8.80	30.90	31.95	67.96	95.43	7.5	7.8	0	35.0	160.0	35.0	160.0	35.0	160.0	13.0	15.0

Site 22 - Little Harbor School

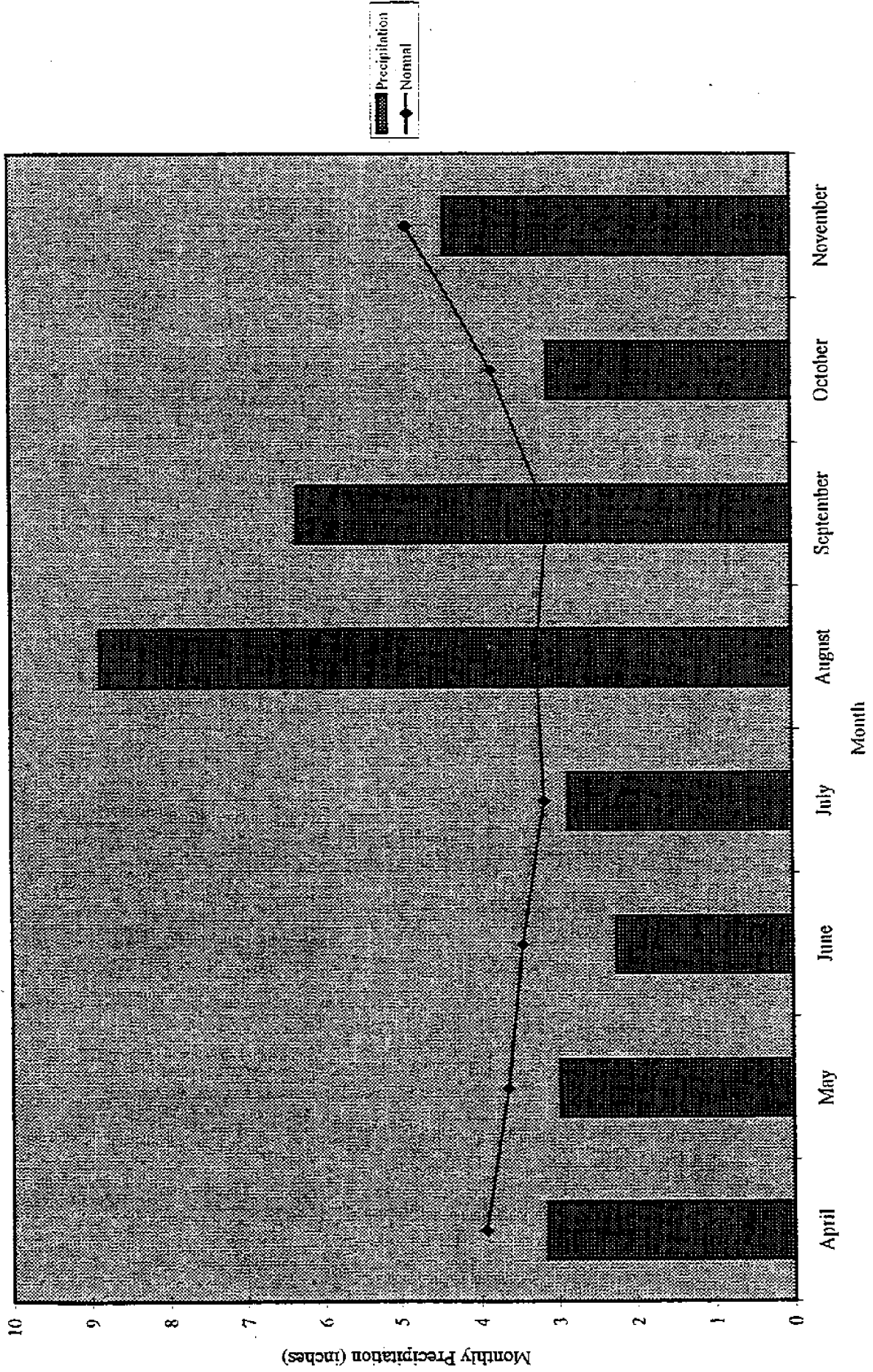
YEAR	SITE	DATE	SAMPLER-L	SAMPLER-H	WTMPH-L	WTMPH-H	DO-L	DO-H	SAL-L	SAL-H	SAT-L	SAT-H	SAT-H	pH-L	pH-H	FECAL-L	FECAL-H	LF-L	LF-H	DEPTH-L	DEPTH-H	ATEMP-L	ATEMP-H	
					oC	oC	ppm	ppm	ppt	ppt	%	%	%			CFU/100ML	CFU/100ML	cm	cm	cm	cm	oC	oC	
98	22	9/9/98	*	ML, RB	16.5	16.5	8.40	8.40	31.60	31.60	103.95	103.95	7.8	7.8	0	0	130.0	130.0	1300	1300	*	*	18.5	18.5
98	22	10/7/98	*	ML, DS, FIDP	12.0	12.0	8.50	8.50	32.00	32.00	96.26	96.26	7.8	7.8	0	0	310.0	310.0	310.0	310.0	*	*	14.5	14.5
99	22	11/5/98	*	ML, RB, STUDENTS	8.0	8.0	7.25	7.25	30.20	30.20	74.29	74.29	7.6	7.6	0	0	225.0	225.0	225.0	225.0	*	*	11.0	11.0
99	22	04/29/99	*	MB, RB, BB, CB	10.0	10.0	11.10	11.10	27.70	27.70	116.98	116.98	8.3	8.3	0	0	148.0	148.0	148.0	148.0	*	*	12.0	12.0
99	22	05/17/99	*	DD, EC, MB	17.0	17.0	8.40	8.40	29.00	29.00	103.26	103.26	7.9	7.9	0	0	270.0	270.0	270.0	270.0	*	*	15.0	15.0
99	22	06/15/99	*	DD, MR, BB, RB	20.0	20.0	7.50	7.50	30.40	30.40	98.47	98.47	7.8	7.8	0	0	140.0	140.0	140.0	140.0	*	*	33.0	33.0
99	22	07/13/99	*	CR, RB	18.0	18.0	8.10	8.10	31.45	31.45	103.10	103.10	7.6	7.6	10	10	150.0	150.0	150.0	150.0	*	*	22.0	22.0
99	22	08/12/99	*	BB	19.0	19.0	7.60	7.60	32.15	32.15	99.02	99.02	7.6	7.6	100	100	150.0	150.0	150.0	150.0	*	*	27.0	27.0
99	22	09/13/99	*	BB	20.0	20.0	6.20	6.20	30.40	30.40	81.41	81.41	7.8	7.8	0	0	160.0	160.0	160.0	160.0	*	*	23.0	23.0
99	22	10/12/99	*	*	10.0	10.0	10.00	10.00	31.70	31.70	108.26	108.26	7.1	7.1	10	10	200.0	200.0	200.0	200.0	*	*	11.0	11.0
99	22	11/09/99	*	PL	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
00	22	04/19/00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
00	22	05/18/00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
00	22	07/17/00	*	CH, DM, IM	20.0	20.0	7.90	7.90	28.50	28.50	102.52	102.52	7.5	7.5	10	10	95.0	95.0	95.0	95.0	*	*	21.0	21.0
00	22	08/15/00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
00	22	09/14/00	*	TL, BB, CLASS	23.0	23.0	7.50	7.50	*	*	*	*	7.7	7.7	0	0	115.0	115.0	115.0	115.0	*	*	22.0	22.0
00	22	10/16/00	*	BB, TL, CLASS	11.0	11.0	8.40	8.40	*	*	*	*	7.7	7.7	0	0	200.0	200.0	200.0	200.0	*	*	2.0	2.0
00	22	11/13/00	*	BB, TL, CLASS	11.0	11.0	8.10	8.10	23.00	23.00	84.64	84.64	7.7	7.7	10	10	105.0	105.0	105.0	105.0	*	*	9.0	9.0
01	22	04/24/01	*	TL, RB	14.0	14.0	10.30	10.30	21.70	21.70	113.86	113.86	7.6	7.6	0	0	180.0	180.0	180.0	180.0	*	*	25.0	25.0
01	22	03/23/01	*	TL, S	15.0	15.0	10.60	10.60	29.15	29.15	125.35	125.35	7.8	7.8	0	0	150.0	150.0	150.0	150.0	*	*	20.0	20.0
01	22	06/21/01	*	TL, RB	17.0	17.0	10.80	10.80	27.70	27.70	131.68	131.68	7.5	7.5	30	30	180.0	180.0	180.0	180.0	*	*	17.0	17.0
01	22	07/23/01	*	TL, CL	25.0	25.0	10.20	10.20	31.50	31.50	147.41	147.41	7.7	7.7	0	0	165.0	165.0	165.0	165.0	*	*	31.0	31.0
01	22	08/26/01	*	PL, CL	21.5	21.5	7.10	7.10	32.20	32.20	96.88	96.88	7.7	7.7	10	10	155.0	155.0	155.0	155.0	*	*	22.0	22.0
01	22	09/18/01	*	BB, TL, MM, MM, SR, SA	18.0	18.0	6.00	6.00	32.55	32.55	76.91	76.91	7.6	7.6	0	0	200.0	200.0	200.0	200.0	*	*	23.0	23.0
01	22	10/17/01	*	PL, BB, SB, RD, MR, JG	14.0	14.0	8.00	8.00	32.80	32.80	94.94	94.94	7.6	7.6	10	10	205.0	205.0	205.0	205.0	*	*	12.0	12.0
01	22	11/01/01	*	WN, SB, PM, DM, NL, GM, TL, BB, KB	10.0	10.0	8.30	8.30	34.75	34.75	91.76	91.76	7.4	7.4	0	0	160.0	160.0	160.0	160.0	*	*	10.0	10.0

Appendix II - Graphs of Monthly precipitation 1990-2001

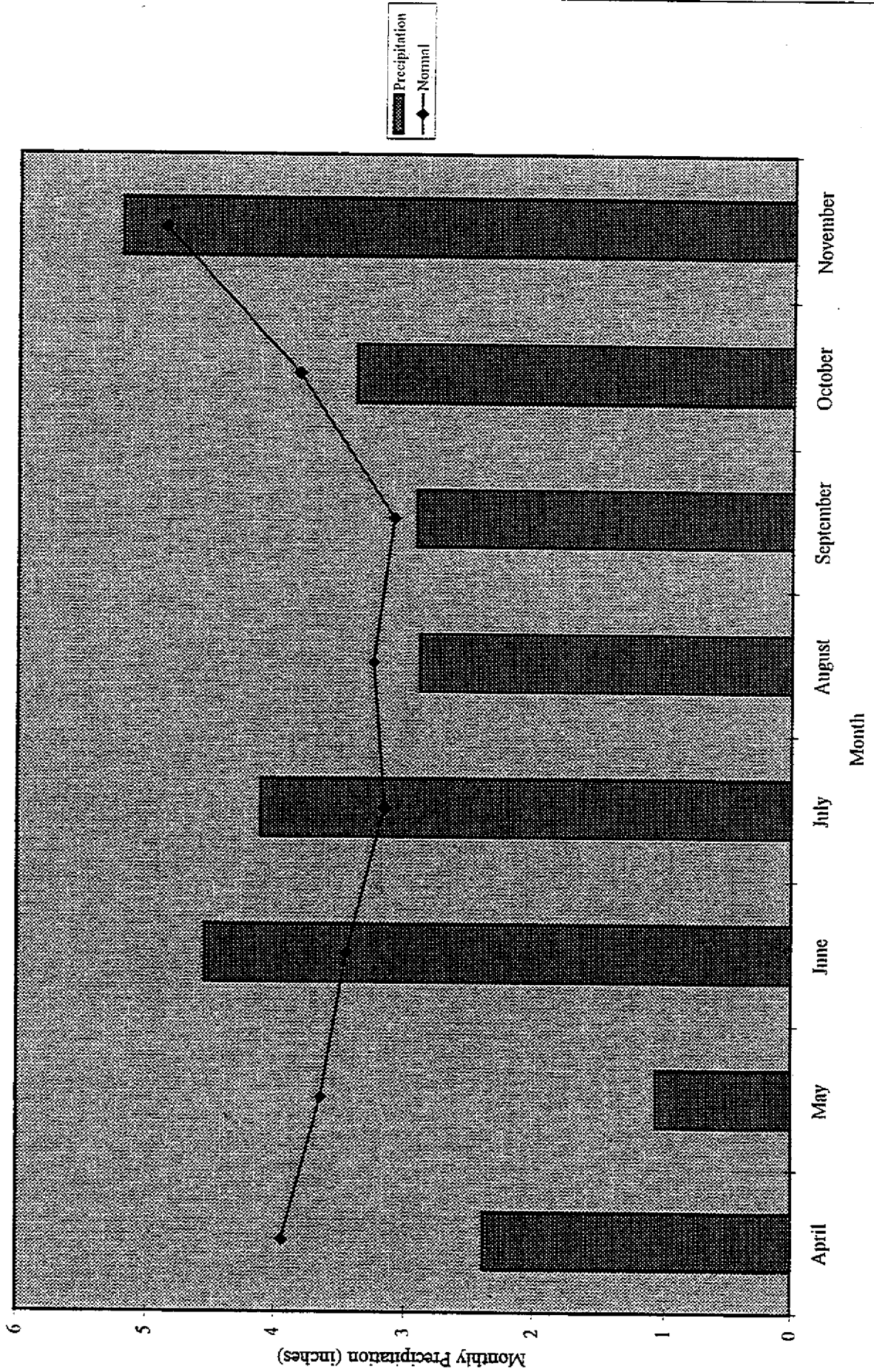
1990 Precipitation Data Town of Durham, Strafford County



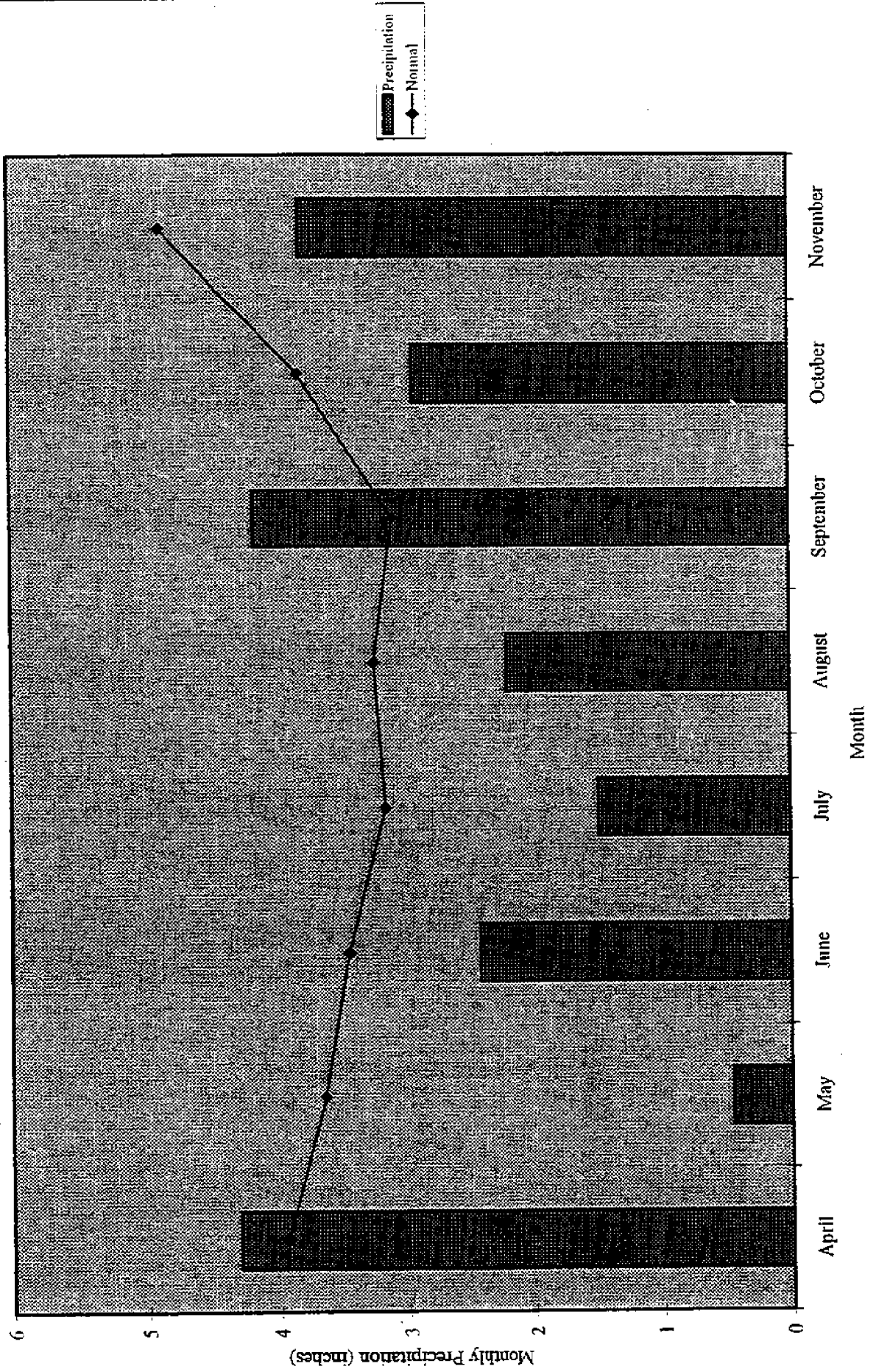
1991 Precipitation Data Town of Durham, Strafford County



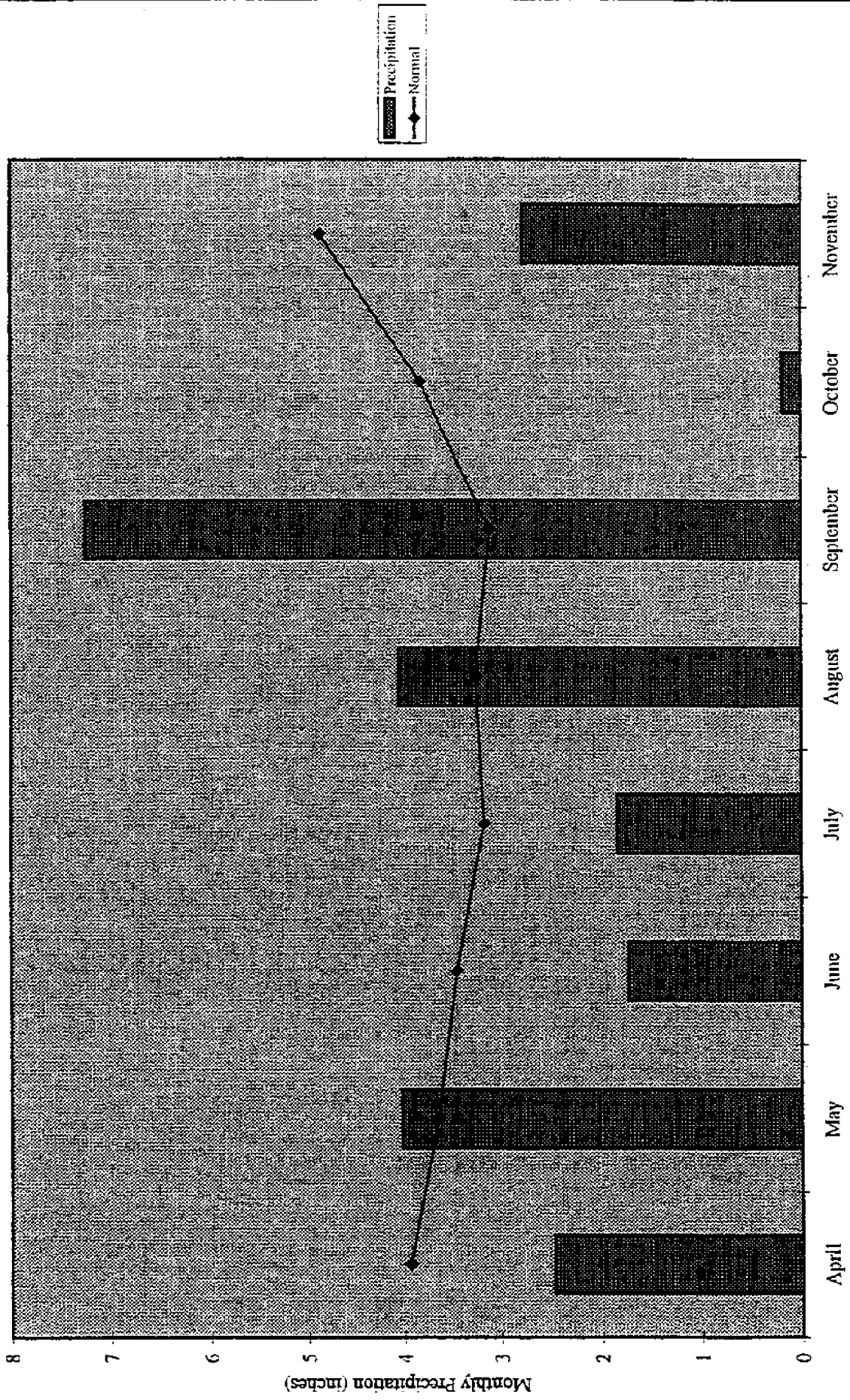
1992 Precipitation Data Town of Durham, Strafford County



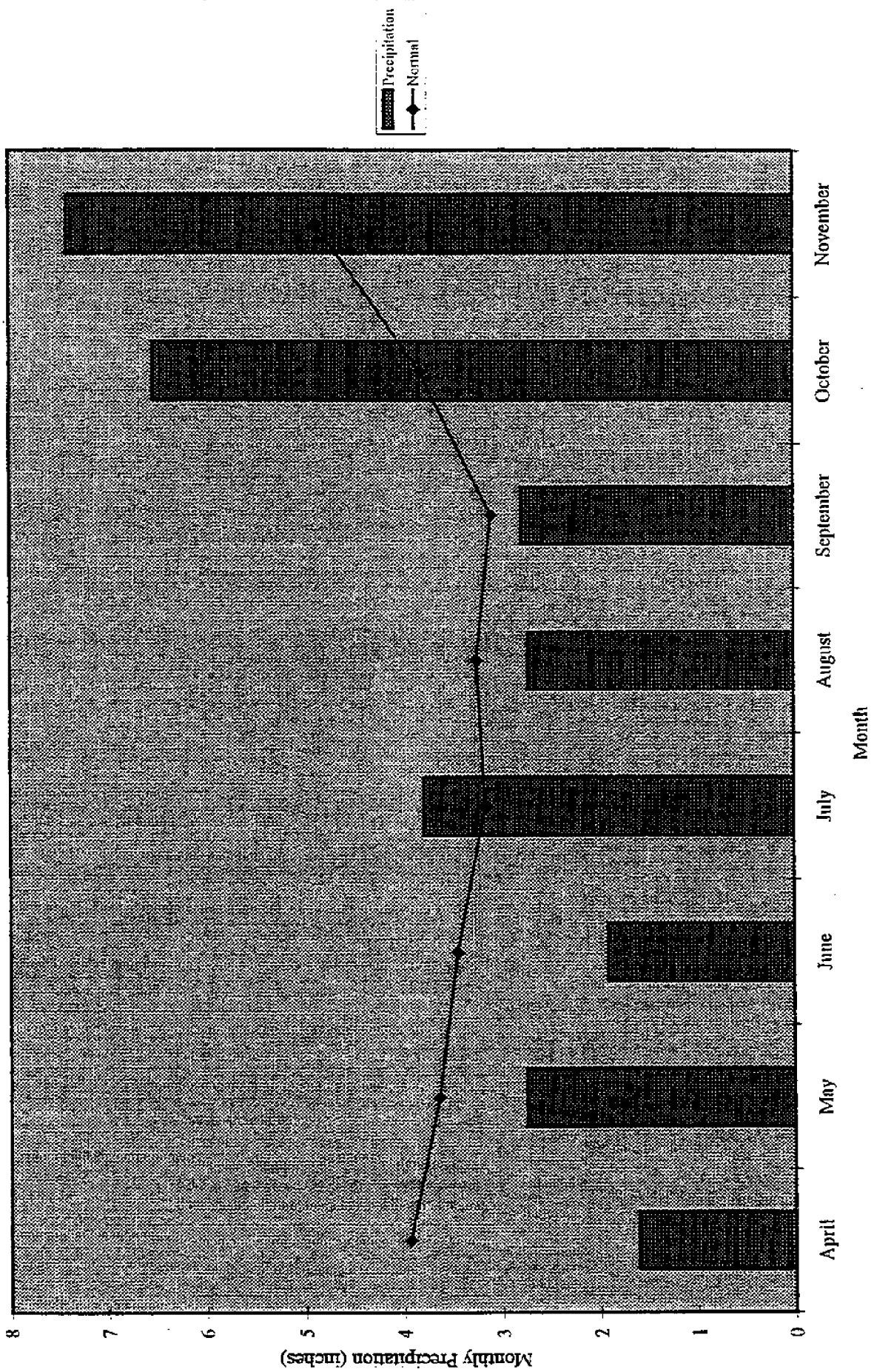
1993 Precipitation Data Town of Durham, Strafford County



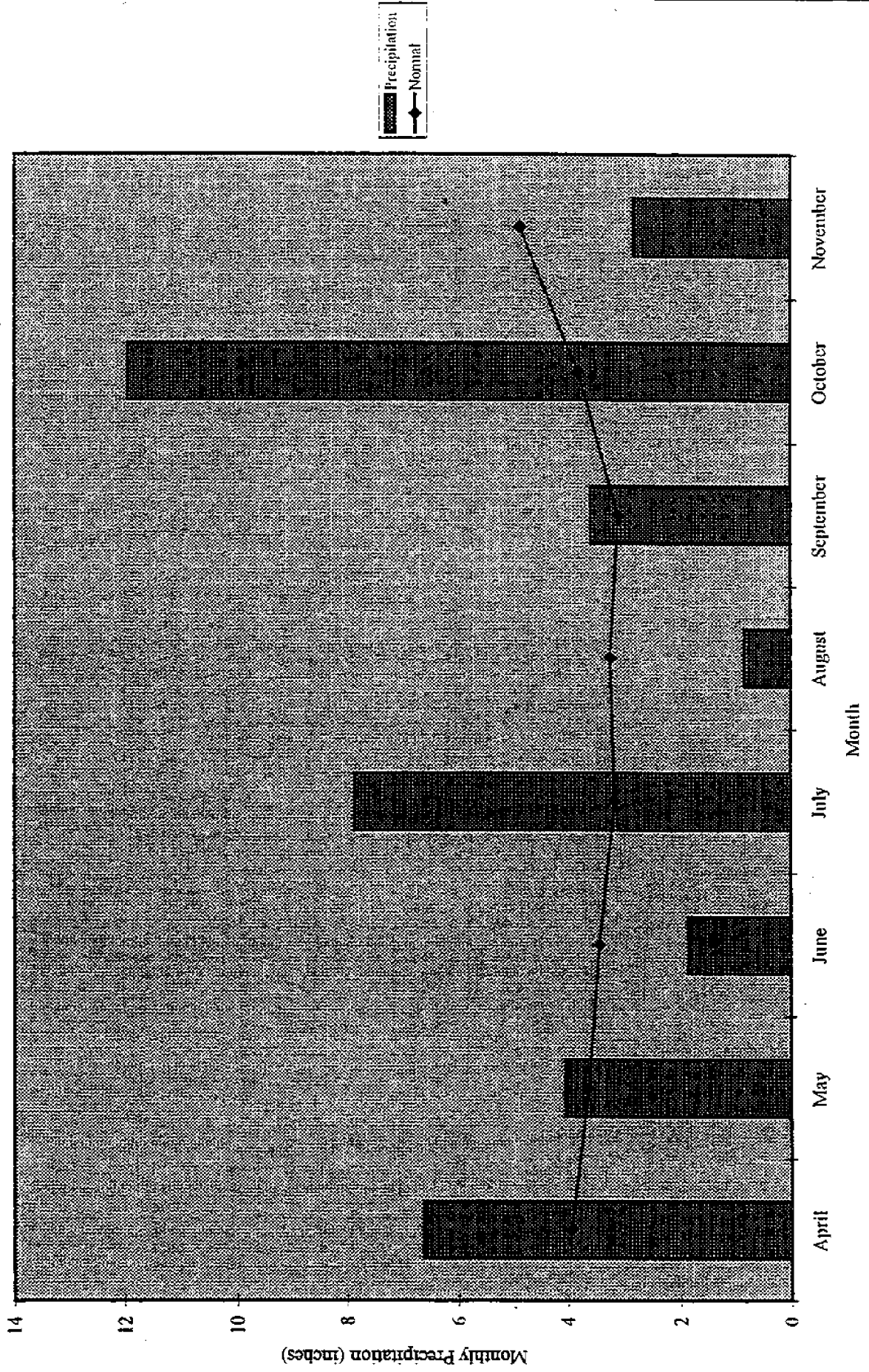
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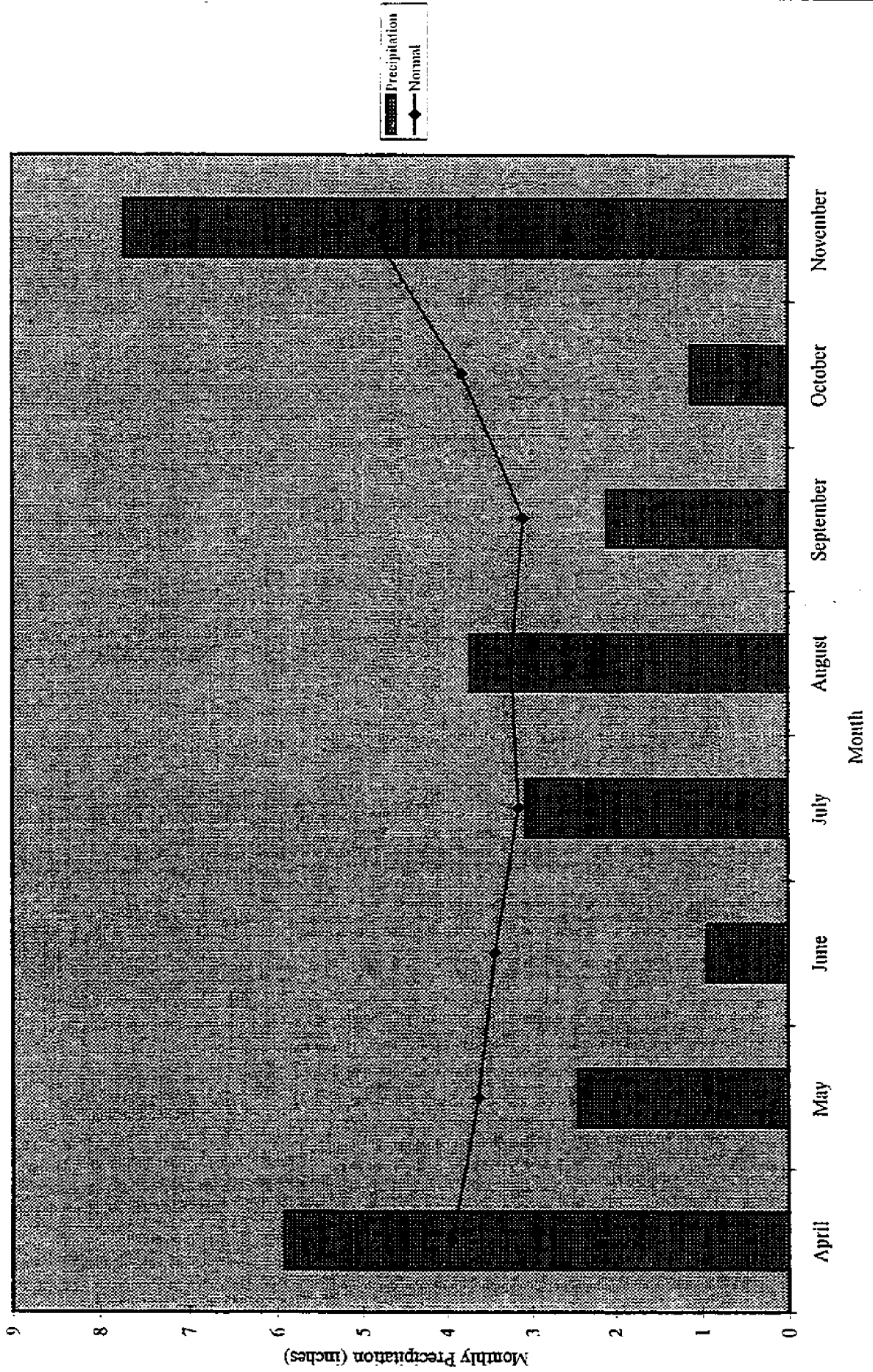
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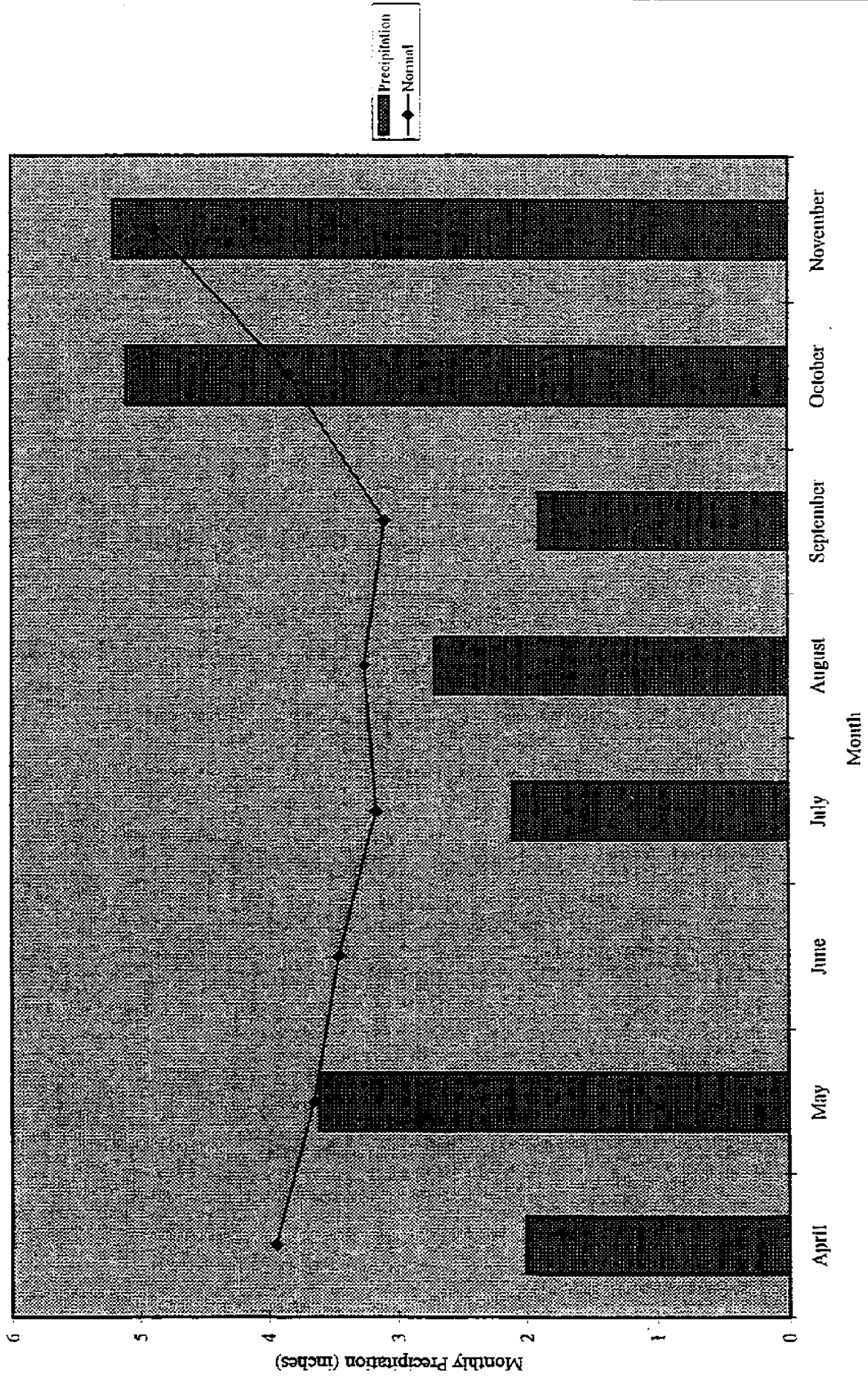
1996 Precipitation Data Town of Durham, Stafford County



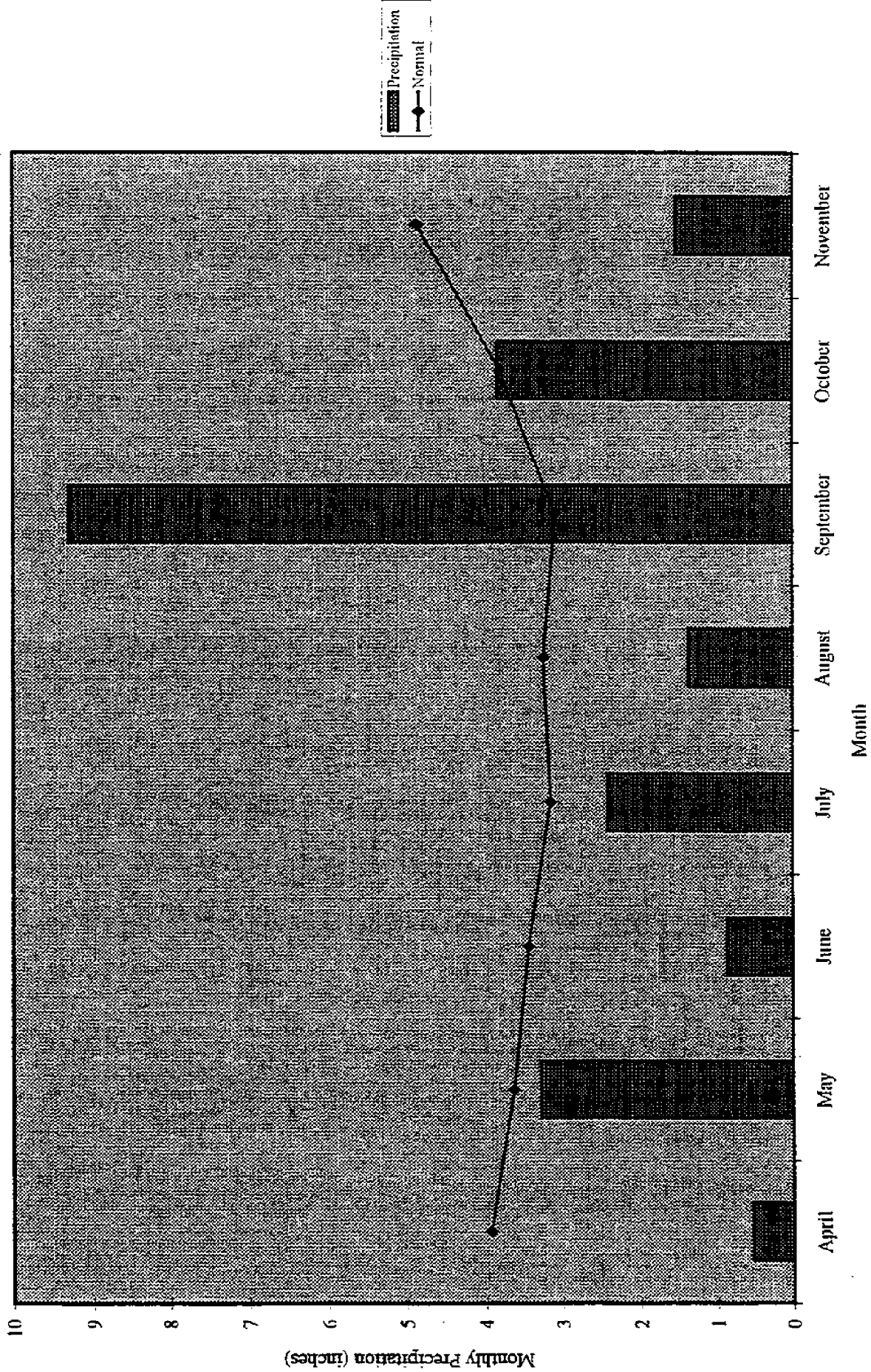
1997 Precipitation Data Town of Durham, Strafford County



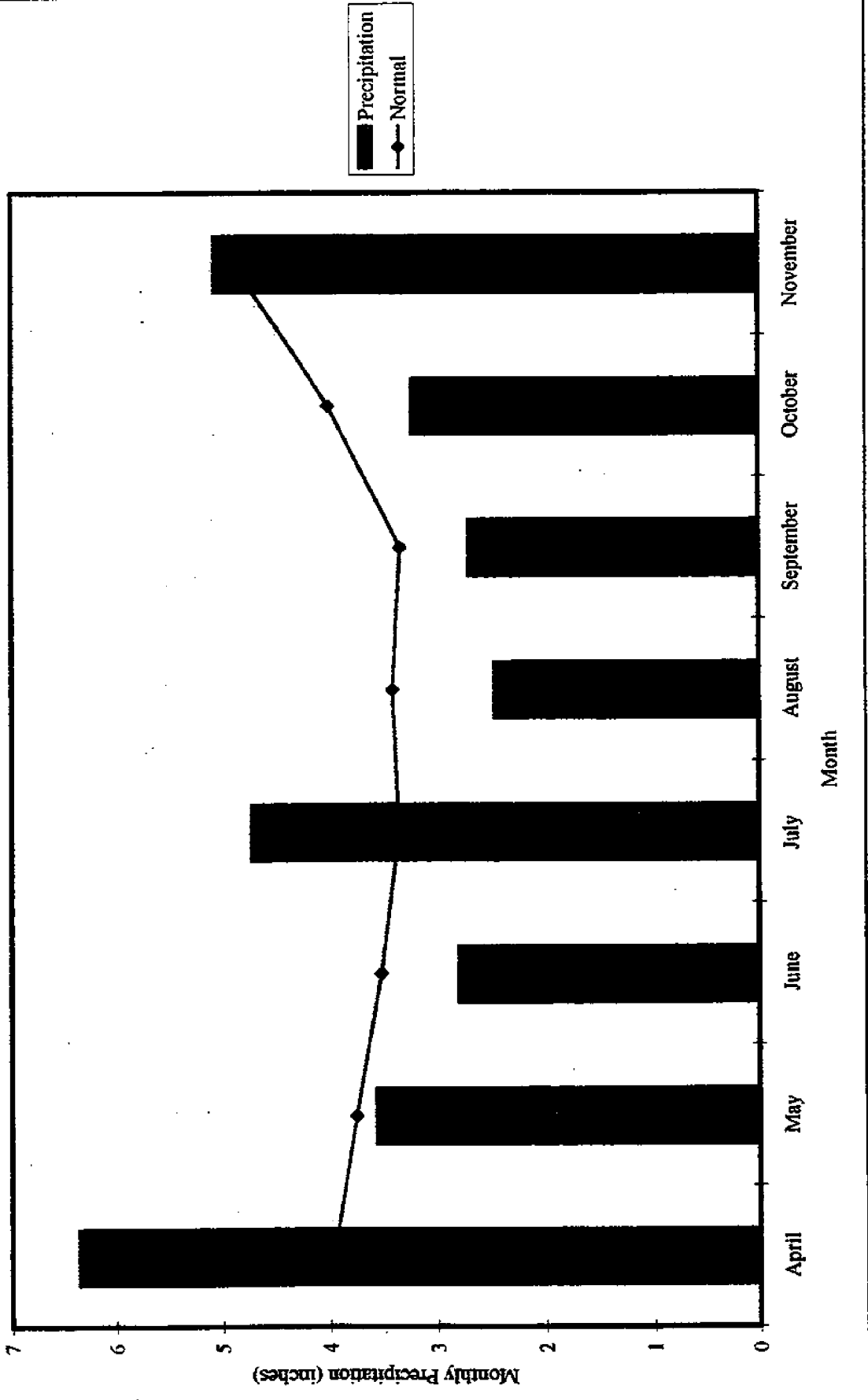
1998 Precipitation Data Town of Durham, Strafford County



1999 Precipitation Data Town of Durham, Strafford County



2000 Precipitation Data Town of Durham, Strafford County



2001 Precipitation Data Town of Durham, Strafford County

